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The five levels of workflow: how workflow management technology will change the process of client/server accounting. (first in a series on innovations in client/server applications, focusing on accounting applications)
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TEXT:
HOW WORKFLOW MANAGEMENT TECHNOLOGY WILL CHANGE THE PROCESS OF CLIENT/SERVER ACCOUNTING.

During 1994, more than a dozen new client/server accounting packages will emerge, adding to the handful of products already shipping. Most will use object-oriented development tools and offer GUIs connected to relational database engines. The packages will represent the leading edge in client/server business management applications, and, as a result, you can expect innovations in both package design and functionality.

This is the first in a series of articles examining client/server application innovation, focusing on the application that is core to all businesses -- accounting. In each article, I will introduce a specific innovation, discuss its characteristics, review its implementation in commercial products, and provide a checklist of key features for use in evaluations. I will also focus on how users benefit from these innovations, and how developers, systems analysts, and architects who build client/server systems can implement them. Developers who do not work with accounting systems specifically can use these articles as a source for new concepts in application design and implementation.

Accounting Automation: Introducing Workflow

Workflow management is like molten metal on a blacksmith's anvil: It's hot. It's going to be molded into a great tool, but it's shapeless and needs a lot of hammring to mold it into something useful. Workflow is the automation of business processes through an intelligent set of task management tools that interpret and act upon events. This technology is currently in its infancy. No standards exist, although groups such as the Workflow Management Coalition are convening to define them. There is also no sizable market, although most major vendors have announced workflow initiatives. Also, companies such as Reach Software, Action Technologies, and ViewStar Corp. offer workflow solutions. There are few hard statistics about workflow's benefits, but marketers will tell you it's the next wave in corporate reengineering. In short, workflow is more of a developing concept than a reality.

New corporate technology infrastructures such as enterprise messaging, common database platforms, client/server architectures, and groupware applications like Lotus Notes, are fueling the demand for workflow management technology. This demand will increase as organizations see cost and quality benefits from greater process efficiencies in all aspects of their business. Workflow will have the greatest impact on corporate accounting systems in which business processes abound and the opportunities for efficiency are legion.

Accounting Aautomation: A Sample Business Process

To understand workflow, let's examine a typical business process such as the purchasing cycle. Table 1 shows a typical version of this process; the left column indicates the process steps. The right column shows how most accounting applications handle each step. In this process, the purchasing transaction has a defined life cycle. It metamorphoses into various documents, requires a range of decision steps, and involves many people.

Already you can see some workflow concepts emerging. Creating the requisition in an event that inserts, a transaction into the database. As a result, another person must take a certain action. In this case, the person must approve the requisition. To take that action, the system must route the requisition data to a supervisor for approval. On approval, the system routes the transaction (or the transaction in document form) to the purchasing department for conversion into an order. The purchasing department then reviews groups of requisitions, and applies rules to consolidate them into orders. The system then images or prints the order and routes it by mail or fax to the vendor. A more intelligent method of using software to manage this process could result in major cost and time savings. This is what workflow is all about.

Purchasing is an obvious business process that workflow can automate, and many other accounting examples exist, such as month-end closing, inventory availability, order processing credit control, and cash management.

The Five Levels of Worflow

A software-based workflow solution can come as a built-in accounting application component, or it can come in third-party products such as forms-management or e-mail packages. Regardless of where you find "workflow technology," I define it as a set of functional agents implemented in various levels of sophistication. I count five such levels, as follows.

Level 1: Events, Scheduling, and Monitoring. At this level, the accounting system recognizes events, users can schedule events, and the systesm monitors events and maintains audit trails. Events include low-level database events, such as INSERT, UPDATE, and DELETE actions; high-level application events, such as posting an invoice, running a report, or generating a balance file; and alerter events that result from reaching a threshold, such as an inventory reorder point or customer credit limit.

By monitoring alerter events and providing a way to react to them, the software involves higher-level decision makers and prevents business-critical thresholds from being overrun.

Level 2: Imaging and Routing. The second level provides features for packaging data as tabular query results or digital images, and routing them to recipients through messaging gateways. Most accounting processes generate documents you typically print, then file, mail, or fax, such as invoices, statements, and purchase orders. Storing these documents as digital images saves space and paper, and preserves them indefinitely. Routing them automatically to vendors, customers, and internal employees through a messaging gateway (such as e-mail, fax, or Electronic Document Interchange [EDI] saves time and reduces transaction life cycles. Many corporations already implement these messaging gateways.

[TABULAR DATA OMITTED]

Level 3: Alerters and Actions. The third level builds on the functionality of the first two levels by alerting system users to specific events and providing a way for them to act accordingly. These are analogous to in-and out-boxes and to-do lists. Because both alerters and actions require a degree of intelligence, the system must provide two additional knowledge bases: a rule base and a hierarchy tree. The rule base encapsulates rules about which events trigger alerts, how the system packages alert data for action, and what functionality (such as exception handling) an alert provides. The hierarchy tree indicates "reports to" relationships in the organizational chart for automating the routing of alerts to the correct individuals. For example, entering a requisition alerts a supervisor and displays an action "dialog" on the supervisor's screen requesting an immediate approval. The supervisor does not have to know anything about the application generating the alert.

The rule bse could grow quite complex, but it is essentially based on a collection of If...Then...Else constructs. The release must capture a range of possibilities relating to each event, alert, and action. For example, the "new requisition insert event" could have a whole range of entries in the release to cover budgetary controls, authorization limits, item permissions, priority levels, and exception handling. Similarly, the hierarchy tree must embody rules relating to routing levels, substitution

alternatives, and override conditions.

Level 4: Workflow Analysis. This level provides the means for analyzing the workflow and optimizing the business process based on information captured process based on information captured during monitoring. These functions log workflow events, documents, alerts, actions, and exception conditions to provide a means of analyzing user activity, system usage, and event trends. This provides useful human resource and systems information relating to resource utilization and/or process bottlenecks, and assists in the redesign of workflow processes.

[TABULAR DATA OMITTED]

Level 5: Visual Process Automation. At it smost sophisticated level, workflow technology provides a process automation tool for visually diagramming business processes and automatically generating the workflow components I've described. By drawing on an underlying repository of events, routing optins, alerts, and actions, the process automation tool creates a visual process schema for the accounting software's workflow manager. This provides a high-level way to define and automate business processes, and serves double-duty as a key reengineering tool.

With this understanding of the five levels of workflow, let's take a look at Table 2 (see page 75), which shows how this feature set maps onto our purchasing cycle. The left column shows the same life-cycle steps as Table 1. The right column illustrates how workflow can automate the process. Note that the processes are reduced by 50 percent and human interaction is limited to decision-making "spikes."

Workflow in Accounting

In reality, few applications embody any of the five levels of workflow I've described, but several vendors have indicated that workflow will play an increasingly important role in their accounting applications. Vendors are approaching workflow from two directions: They are building workflow into their application architectures on the inside, and working with third parties to integrate workflow from the outside.

Dun & Bradstreet's Activity Stream. Of the vendors shipping client/server accounting packages, Dun & Bradsheet Software offers the most workflow functionality in its Financial Stream product line, which is built on a workflow paradigm.

Dun & Bradsheet builds its applications around user activities, rather than the traditional ledger design. Financial Stream consists of more than 180 separate application activities. Each activity is a set of windows that corresponds to functional sequences, such as entering a vendor invoice or raising a purchase order. A Workflow Administrator tool combines these activities with events and "next steps."

In Financial Stream, an activity may be "enter an invoice," an event may be "save an invoice," and a next step may be "send the invoice to a supervisorr for approval." This is not just a set of menu options, as in other systems; rather, the user defines these workflows. The user selects from a browser window every activity, event, and next step for packaging into a personalized business process. When you combine this functionality with an e-mail in-and out box and a real-time to-do list, you have the foundation for a powerful workfoow processing system.

The browser itself employs an office metaphor and may reflect the user's functional role. A busy clerk or supervisor using Financial Stream may have a browser with individual and workgroup to-do lists, an in-and out-box, and multiple activity lists for maintaining structures or posting transactions. The head of a department may have only an in-and out-box for processing approvals, which would reflect a more casual, higher-level implementation of the system.

Financial Stream provides powerful workflow customization. The windows comprising on activity may be modified to reflect the data collection required by the business. Each activity has a user-defined set of events. For example, after entering a vendor invoice, you could place it on hold, and then add an invoice line item to your asset register before sending it out for approval. If this does not reflect your business process, you simply do not link these events to the Invoice Entry activity. Also, you can route documents and action events to individuals or workgroups for inclusion in their to-do lists. Because it revolves around

the user and not the application, Financial Stream represents a new way of interacting with an accounting system.

PeopleSoft Open Workflow. In October 1983, PeopleSoft Inc. announced an Open Workflow strategy for its Financial and human resource management system products. The key to Open Workflow is a Workflow Partners Program that PeopleSoft is pursuing with the vendors of four types of workflow technology: electronic forms, e-mail, database agents, and imaging. Currently, PeopleSoft supports images, as well as outbound e-mail connectivity complying with Vendor Independent Message (VIM) and Microsoft's Messaging Application Programming Interface (MAPI) standards. PeopleSoft plans full e-mail and other overflow support in PeopleTools 4.0, the next version of the company's application development tool scheduled for release in the third quarter of this year.

The current versions of PeopleSoft's applications and PeopleTools provide some workflow support. For example, you can automate timesheet entry using table-driven rules expressed in PeopleTools' procedural language and linked to the timesheet entry forms. The software also supports Action Lists for sequencing and scheduling tasks. For low-cost, high-impact workflow of such paper-driven processes as purchasing. PeopleSoft is working on integrating electronic forms with its accounting functions and database. This will let users enter a transaction, such as a purchase requisition, into a third-party forms product. PeopleSoft functions will then parse the data to check its validity, security, auditability, and so forth, and then either "post" the data to the database or route the form to a supervisor for approval before posting.

Rich Bergqist, PeopleSoft's vice president of technology, says the company's workflow strategy was influenced by the Seybold Group's concept of the three R's of workflow: roles, and routing.

Other Workflow Visions

Many other accounting vendors are putting their workflow strategies in place. (See Table 3, page 76.) Walker Interactive Systems, which recently shipped the first beta version of its Redwood client/server accounting product, plans to include significant workflow features when the product ships in the third quarter of 1994. Walker is combining an internal workflow management layer with third-party tools to focus on defining, improving, and managing business processes.

Stephane DuBois, a Walker product manager, explained that this approach calls for a three-component architecture: First, a function interface for building and customizing user data-entry forms that make use of Application Logic Services (the functions that carry out tasks such as posting transactions and querying tables); second, a Workflow Manager to link the forms of together and manage the sequencing of the workflow process and the completion of tasks; and third, a table-driven data dictionary of rules and task specifications. Walker will not do all of this on its own, but will collaborate with several workflow specialists, such as Edify Corp. for its agent (event-driven processes) software, and FileNet Corp. for its imaging software.

Naturally, compatibility with corporate e-mail standards such as MAPI or VIM will also be essential for workflow routing.

Dave Hill, JD Edwards & Co.'s director of product marketing, claims that the company's IBM AS/400-based packages have provided workflow all along in the form of an internal e-mail system, links to EDI, and a parameter-driven way to define the steps making up an accounting activity. As a result, JD Edwards aims to provide an evolutionary path to more sophisticated workflow management in its forthcoming client/server accounting products, by gradually migrating its internal e-mail to standards such as MAPI, and increasing the alerting, exception handling, and rule management of its existing workflow functions. JD Edwards' first application in this strategy will be a new Travel Expense Management module that includes more alerting and routing functions.

PeopleSoft competitor Integral Inc. also has plans to incorporate significant workflow functionality in its InPower client/server financials, slated for release later this year. Based on its "2nd Generation" client/server technology vision, Integral will focus on encapsulation of business rules, adaptable process flows, and business models. In this

scheme, the business rules exist apart from the application code, while the application itself becomes less procedural and more event-driven. Implementing this vision will require a sophisticated repository of reusable rules and events.

Joel Summers, Integral's vice president of research and development, sees the business-modeling process as the driving force for implementing workflow. Using tools such as KnowledgeWare Inc.'s Application Development Workbench (ADW), business analysts will be able to model workflow processes, and then automatically generate the rule and process repository in Integral from the process schemas. Suddenly the focus of accounting applications shifts from programmers to business users. Summers predicts that workflow technology will accelerate this transition.

What Will Workflow Mean?

The cynics will say that the short-term benefit will be a truckload of money for workflow consultants. It will certainly mean that workflow and business process reengineering knowledge will be mandatory for any team implementing new client/server accounting applications. It will also mean a shift from evaluating packages based on functional checklists to evaluating packages based on the sophisication of the workflow architecture. Undoubtedly, it will lead either to further headcount reductions in accounting departments or, more positively, to redeployment of low added-value personnel to other areas such as customer service or quality control. It must lead to quicker transaction life cycles through process efficiencies and a reduction in costs through digital imaging.

Activity-based and event-driven accounting architectures should prove more adaptable to business change than current systems. Accounting will continue to be more user-and process-driven than MIS-and technology-driven. It will also draw more high-level decision makers into its sphere of influence through alerts and the routing of packaged action dialogs. Finally, workgroup technology will provide a powerful justification for investing in new technology infrastructures such as client/server, business modeling, and e-mail. Within the next five years, workflow and accounting will be synonymous.

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NETWORK AND LIFE CYCLE ASSET MANAGEMENT IN AN E-COMMERCE ENVIRONMENT AND METHOD THEREOF
GESTION D'ACTIFS DURANT LE CYCLE DE VIE ET EN RESEAU DANS UN ENVIRONNEMENT DE COMMERCE ELECTRONIQUE ET PROCEDE ASSOCIE
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English Abstract
  A system, method and article of manufacture are provided for asset
  management in a network-based supply chain. Utilizing a network,
  information is received information from at least one service provider.
  This information includes information relating to present network assets
  of the service provider. Information is also received utilizing the
  network from at least one manufacturer. The information from the
  manufacturers includes information relating to present network assets of
  the manufacturers. A determination is made for optimal network assets
  needed for the service provider and manufacturer based on the present
  network assets of service provider and the manufacturer. Based on this
  determination, the optimizing of the network assets is managed.
French Abstract
  L'invention concerne un systeme, un procede et un article de fabrication
  destines a la gestion d'actifs dans une chaine d'approvisionnement en
  reseau. Ce dernier permet de recevoir des informations provenant d'au
  moins un prestataire de services. Ces informations renferment des
  elements d'information se rapportant aux actifs actuels en reseau dudit
  prestataire. Elles sont egalement recues par le biais du reseau en
  provenance d'au moins un fabricant. Les informations des fabricants
  comportent des elements d'information se rapportant aux actifs actuels en
  reseau des fabricants. On determine les actifs en reseau optimaux
  necessaires au prestataire de services et au fabricant sur la base des
  actifs actuels en reseau desdits prestataire de services et fabricant.
  Cette determination permet de gerer l'optimisation des actifs en reseau.

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Claim

1 A method for asset management in a network-based supply chain, comprising the steps of(a) receiving information from at least one service provider utilizing a network, wherein the information from the at least one service provider includes information relating to present network assets of the at least one service provider;
(b) receiving information from at least one manufacturer utilizing the network, wherein the information from the at least one manufacturer includes information relating to present network assets of the at least one manufacturer;
(c) determining the needed optimal network assets based on the present network assets of service provider and the manufacturer; and
(d) managing the optimizing of the network assets based one the determination of needed optimal network assets.
482
. A method as recited in claim 1, further comprising the step of managing the life cycle of network assets of the at least one service provider and the at least one manufacturer utilizing the network.

3 A method as recited in claim 2, wherein a life cycle management model is utilized for managing the life cycle of the network assets.

4 A method as recited in claim 1, further comprising the step of tracking network assets of the at least one service provider and the at least one manufacturer utilizing the network, wherein the network assets are tracked according to at least one: growth of the network asset, capacity of the network asset, technological level of the network asset, and amount of the network asset.

5 A method as recited in claim 4, wherein an asset tracking tool is utilized for tracking the network assets.

6 A method as recited in claim 1, further comprising the step of managing the roll-out of services provided by the at least one service provider and manufacturer offerings provided by the at least one manufacturer based on the received present network asset information utilizing the network.

7 A method as recited in claim 6, wherein a roll-out planning tool is utilized for managing the roll-out of services provided by the at least one service provider and manufacturer offerings provided by the at least one manufacturer.

8 A method as recited in claim 1, further comprising the step of facilitating the sharing of technology between the at least one service provider and the at least one manufacturer utilizing the network.

9 A computer program embodied on a computer readable medium for asset management in a network-based supply chain, comprising:
(a) a code segment that receives information from at least one service provider utilizing a network, wherein the information from the at least one service provider includes information relating to present network assets of the at least one service provider;
483
(b) a code segment that receives information from at least one manufacturer utilizing the network, wherein the infon-nation from the at least one manufacturer includes information relating to present network assets of the at least one manufacturer;
(c) a code segment that determines the needed optimal network assets

based on the present
network assets of service provider and the manufacturer; and
(d) a code segment that manages the optimizing of the network assets
based one the detennination of needed optimal network assets.

10 A computer program as recited in claim 9, further comprising a code
segment that manages the life cycle of network assets of the at least one
service provider and the at least one manufacturer utilizing the network.

11 A computer program as recited in claim 10, wherein a life cycle
management model is utilized for managing the life cycle of the network
assets.

12 A computer program as recited in claim 9, further comprising a code
segment that tracks network assets of the at least one service provider
and the at least one manufacturer 1 5 utilizing the network, wherein the
network assets are tracked according to at least one: growth of the
network asset, capacity of the network asset, technological level of the
network asset, and amount of the network asset.

13 A computer program as recited in claim 4, wherein an asset tracking
tool is utilized for tracking the network assets.

14 A computer program as recited in claim 9, further comprising a code
segment that manages the roll-out of services provided by the at least
one service provider and manufacturer offerings provided by the at least
one manufacturer based on the received present network asset information
utilizing the network.
15 A computer program as recited in claim 14, wherein a roll-out planning
tool is utilized for managing the roll-out of services provided by the at
least one service provider and manufacturer offerings provided by the at
least one manufacturer.
484
. A computer program as recited in claim 9, further comprising a code
segment that facilitates the sharing of technology between the at least
one service provider and the at least one manufacturer utilizing the
network.

17 A system for asset management in a network-based supply chain,
comprising: (e) logic that receives information from at least one service
provider utilizing a network, wherein the information from the at least
one service provider includes infori-nation
relating to present network assets of the at least one service provider;
(f) logic that receives information from at least one manufacturer
utilizing the network, wherein the information from the at least one
manufacturer includes information relating
to present network assets of the at least one manufacturer;
(g) logic that determines the needed optimal network assets based on the
present network
assets of service provider and the manufacturer; and
(h) logic that manages the optimizing of the network assets based one the
deten-nination of needed optimal network assets. 1 5 18. A system as
recited in claim 17, further comprising logic that manages the life cycle
of network assets of the at least one service provider and the at least
one manufacturer utilizing the network.

19 A system as recited in claim 17, further comprising logic that tracks
network assets of the at least one service provider and the at least one
manufacturer utilizing the network, wherein the network assets are
tracked according to at least one: growth of the network asset, capacity
of the network asset, technological level of the network asset, and
amount of the network asset.

20 A system as recited in claim 17, further comprising logic that manages
the roll-out of services provided by the at least one service provider

and manufacturer offerings provided by the at least one manufacturer based on the received present network asset information utilizing the network.

21 A method for life cycle network asset management in a network based supply chain, comprising the steps of.
a) monitoring a supply chain network;
485
b) receiving events from network assets;
C) filtering and correlating the events, whereby problems with network assets are further
isolated; and
d) translating the filtered and isolated events into a standard object fortnat for facilitating the determination of the life cycle of problem network assets.

22 A method as recited in claim 21, wherein the network assets include both packet-switched and circuit-switched network assets.

23 A method as recited in claim 22, wherein the events are received by custom software interfaces which communicate directly with the network assets.

24 A method as recited in claim 23, wherein the custom software interfaces sort the events prior to the filtering and correlating of the events.

25 A method as recited in claim 21, wherein the correlation is provided by rules based inference engines.
26 A method as recited in claim 23, wherein the events are translated by a comprehensive library of all possible message types provided by the custom software interfaces.

27 A system for life cycle network asset management in a network based supply chain,
comprising:
a) logic that monitors a supply chain network;
b) logic that receives events from network assets;
C) logic that filters and correlates the events, whereby problems of network assets are further
isolated; and
d) logic that translates the filtered and isolated events into a standard object fort-nat for facilitating the deten-nination of the life cycle of problernhetwork assets.

28 A system as recited in claim 27, wherein the network assets include both packet-switched and circuit-switched network assets.
486
. A system as recited in claim 28, farther comprising custom software interfaces which communicate directly with the network assets and provide the network asset events to the system.
30 A system as recited in claim 29, wherein the custom software interfaces sort the events prior to the filtering and correlating of the events.

31 A system as recited in claim 2 1, further comprising rules based inference engines which correlate the events.

32 A system as recited in claim 23, further comprising a comprehensive library of all i le message types provided by the custom software interfaces that translates the
possib
events into standard object fori-nat.

33 A computer program embodied on a computer readable medium for life

cycle network
asset management in a network based supply chain, comprising:
a) a code segment that monitors a supply chain network;
b) a code segment that receives events from network assets;
1 5 C) a code segment that filters and correlating the events, whereby
problems of network
assets are further isolated; and
d) a code segment that translates the filtered and isolated events into a
standard object format for facilitating the determination of the life
cycle of problem network assets.

34 A computer program as recited in claim 33, wherein the network assets
include both ?O packet-switched and circuit-switched network assets.

35 A computer program as recited in claim 34, wherein the events are
received by custom software interfaces which communicate directly with
the network assets.

36 A computer program as recited in claim 35, wherein the custom software
interfaces sort the events prior to the filtering and correlating of the
events.
487
. A computer program as recited in claim 33, wherein the correlation is
provided by rules based inference engines.

38 A computer program as recited in claim 33, wherein the events are
translated by a comprehensive library of all possible message types
provided by the custom software interfaces.
488
120
N E7WORK (1 35)
110 116 114 118 134
MMUNICATION
ADAPTER
124 138
USER
INTERFACE DISPLAY
ADAPTER ADAPTER
132 126 8
Figure 1
02
200
206 E-Cornmerce Market Space'@@--.-,.--,
i AC's e-,Supply Chain Enterprise I
t Demand Maintenance Pr@@nent
Installation Order Network Asset a istribufion
Ma & Supply I i nd ered
nagernen Planning Management Ma Service Inyentory Logistics..
2 OZi 212--@) 1 6
8 210 214 220
SPi
204
Figure 2
3 2
MANAGING INSTALLATION OF A SERVICE UTILIZING A NETWORK
4
PLANNING DEMAND AND SUPPLY OF MANUFACTURER
OFFERINGS UTILIZING THE NETWORK
6
MANAGING ORDERS FOR THE MANUFACTURER OFFERINGS
UTILIZING THE NETWORK
8
UTILIZING THE NETWORK TO MANAGE NETWORK ASSETS
I F
310

PROVIDINGMAINTENANCEANDSERVICEFORTHENETWORK
ASSETS UTILIZING THE NETWORK

Figure 3

3/129

408 410 412 414

4@

Installation Demand & Order Netwo
Management Supply Management
Planning Man ent

402 Faster time to site
integration
Fs-P I
Better on-line network
performance
>
IX Z
SP
Rapid integration of Sp
acquisition Fs P
Faster order to cash
Fm
1 i
7M
Duplication reduction
404 :FsPTml1,FsP1
aDistribution facility
rationalization
-sp @m
.2
0 9Procurement
0
rationalization
:Fs PI F-m I Fs-P-1
a Simplified processes F 'm] Fs 7P
eTransportation
rationalization
406
S..P@
6Reduced inventories
.2
SP]
CL
aManufacturing
capacity utilization

Figure 4

Core Competencies New Busine
502 Service Provider Servi(
* New customer acquisitions Network is a Provide an c
e New customer segmentation planned based channel for i
strategy on a capability, offerings fro
i.e. capacity and manufictur(
* Strategic technology mgmt ieatures) e Move to a fc
e Technology life cycle release strab
management service offer
* New service offerings
Availability of
504 Martuf acturer sites is Man
*Focus on managin@.the synchronized Gain the pot
lss-@ customer relationship with the the network
network roll out their solutioi
Focus on managing production
capacity joint *The ability f(
*Focus on R & D optimization of manufacturE
network assets alliances wit
*Focus on market coverage roll integratorst

out diffdrentiato

Figure 5

212

208 210 ()Supply Market Space 214

Demand &

Installation Order Network Asset Mal

1 supply I i

Management M nagement Management ani

Planning

End to end process visibility and harmonization

New Capabilities

202 E -Collaborative 0 Collaborative 0 Increased visibility E Life cycle

0 Proac

management forecasting management maru

0 Tracking and

0 Milestone based 0 Collaborative status N Asset tracking N Scha

:3 project planning network roll-out N Order capture e Growth planr

0 ViSibility and planning

N Standardization/ a Capacity 0 Incre

N Supply infor

Hardware compliance m Technolo

=3

C: Services Coordination a Amount visib:

M 0 Collaborative

Capacity Planning 0 Product

0 Reverse inventorv launch/rollout

management 0 Technology

0 Technology Sharing

sharing

Main Enablers

Collaborative 0 Supply chain E Electronic order N Asset tracking tool 0

Plaru

planning tool planning tool capture 0 Life cycle E NetvA

New installation 0 Production 0 Electronic-based management inter]

processes planning tool order flow model

0 Roll-out planning 0 Order tracking 0 Roll-out

tool tool Planning Tool

0 Network

oe2rations link

Figure 6

RECEIVING INFORMATION FROM AT LEAST ONE SERVICE 2

PROVIDER UTILIZING A NETWORK, WHEREIN THE INFORMATION

OF THE AT LEAST ONE SERVICE PROVIDER INCLUDES

INFORMATION RELATING TO THE SERVICE PROVIDED BY THE

SERVICE PROVIDER

RECEIVING INFORMATION FROM AT LEAST ONE MANUFACTURER 4

UTILIZING THE NETWORK, WHEREIN THE INFORMATION OF THE

MANUFACTURER INCLUDES INFORMATION RELATING TO

MANUFACTURER OFFERINGS

MATCHING THE SERVICE TO THE MANUFACTURER OFFERINGS

8

UTILIZING THE SERVICE AND MANUFACTURER OFFERINGS

INFORMATION TO MANAGE INSTALLATIONS

Figure 7

7/129

RECEIVING INFORMATION FROM AT LEAST ONE SERVICE 2

PROVIDER UTILIZING A NETWORK, WHEREIN THE INFORMATION

FROM THE AT LEAST ONE SERVICE PROVIDER INCLUDES

INFORMATION RELATING TO DEMAND OF THE AT LEAST ONE

SERVICE PROVIDER

RECEIVING INFORMATION FROM AT LEAST ONE MANUFACTURER

UTILIZING A NETWORK, WHEREIN THE INFORMATION FROM THE

AT LEAST ONE MANUFACTURER INCLUDES INFORMATION

RELATING TO THE SUPPLY OF MANUFACTURER OFFERINGS

AVAILABLE FROM THE AT LEAST ONE MANUFACTURER

6

COMPARINGTHESUPPLYANDDEMANDFORMANUFACTURER
OFFERINGS

8

UTILIZING THE COMPARISON OF THE SUPPLY AND DEMAND FOR
MANUFACTURER OFFERINGS TO PLAN FUTURE SUPPLY AND
DEMAND FOR THE MANUFACTURER OFFERINGS

Fi gure 8

2

RECEIVINGAREQUESTFORANORDERFROMATLEASTONE
SERVICE PROVIDER

F

4

TRANSMITTING THE REQUESTED ORDER TO AT LEAST ONE
MANUFACTURER

6

UTILIZING A NETWORK TO RECEIVE INFORMATION FROM THE
MANUFACTURER RELATING TO THE STATUS OF THE
COMPLETING OF THE ORDER BY THE MANUFACTURER

908

TRACKING THE PROGRESS IN COMPLETING THE ORDER BASED
ON THE INFORMATION RECEIVED FROM THE MANUFACTURER

I F

910

GENERATING PERIODIC PROGRESS REPORTS FROM THE
TRACKING

i F

2

TRANSMITTING THE PERIODIC PROGRESS REPORTS TO THE
SERVICE PROVIDER UTILIZING THE NETWORK

Figure 9

RECEIVING INFORMATION FROM AT LEAST ONE SERVICE 1002
PROVIDER UTILIZING A NETWORK, WHEREIN THE INFORMATION
FROM THE AT LEAST ONE SERVICE PROVIDER INCLUDES
INFORMATION RELATING TO PRESENT NETWORK ASSETS OF
THE AT LEAST ONE SERVICE PROVIDER

RECEIVING INFORMATION FROM AT LEAST ONE MANUFACTURER 1004
UTILIZING THE NETWORK, WHEREIN THE INFORMATION FROM
THE AT LEAST ONE MANUFACTURER INCLUDES INFORMATION
RELATING TO PRESENT NETWORK ASSETS OF THE AT LEAST
ONE MANUFACTURER

1006

DETERMINING THE NEEDED OPTIMAL NETWORK ASSETS BASED
ONTHEPRESENTNETWORKASSETSOFSERVICEPROVIDER
AND THE MANUFACTURER

I F

1008

MANAGING THE OPTIMIZING OF THE NETWORK ASSETS BASED
ONE THE DETERMINATION OF NEEDED OPTIMAL NETWORK
ASSETS

Figure 10

1102

RECEIVING AT LEAST ONE NOTICE FOR RECOMMENDED
MAINTENANCE AND SERVICE FROM AT LEAST ONE
MANUFACTURER UTILIZING A NETWORK

1104

RECEIVING AT LEAST ONE REQUEST FOR MAINTENANCE AND
SERVICE FROM AT LEAST ONE SERVICE PROVIDER UTILIZING
THE NETWORK

F

1106

SCHEDULING MAINTENAN CEANDSERVICEUTILIZINGTHEAT

LEAST ONE NOTICE AND THE AT LEAST ONE REQUEST

I F

1108

TRANSMITTING THE SCHEDULE TO THE AT LEAST ONE
MANUFACTURER AND THE AT LEAST ONE SERVICE PROVIDER
UTILIZING THE NETWORK

Fi gure 11

11/129

1208'

1200

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12 2

1 1 1 1

1210

1214

12 b

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1202 218

1216

TELEPHONE CENTER

Figure 12

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INPUTS OUTPUTS

1306

rrnance Customer QoS
Management

1304 4

usaae

1300 information

vice Quality) Quality

t

usage/ performance

. . . .

. . . .

data request

NIML-SML interface

network usage/

Network Data Mgmt

performance info

p man

rNetwcrk Planning erfor re collection, correlation

Design & Build goals formatting of usage

performance .(Ntwk Maintenanc

determine performance in

degradation -7Restoration

e r start1stop I

-)P. of capacity, utilisation and

Provisioni monitoring - provide notification capacity request Network

Planning)

e r n *[Design & Build

performance

Manage

-initiate Traffic

usageY function network changes Network

performance Provisioning

data

EML-NML interface _

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- - - - - - - - - - - - - - - -

Element

Managemen

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Figure 13
13/129
Collecting data relating to usage
and events occurring over a hybrid
network
1402
Analyzing the data to determine a
status of the hybrid network
1406
Utilizing the status of the hybrid
network during management of the
hybrid network
156
Determining billing rates and
discounts based on the status of
the hybrid network

Figure 14
14/129
INPUTS OUTPUTS
espons Customer
quiries
I End-Customer FE! FM
5 a s t o
n orders
Processes
Sales inquiry usiness needs Sales
Client contact: terface ales inquiry
Problems Management
Inquiries Receive and record contact rder
Orders
Procurement Direct inquiries to appropriate ridling 1502
processes
Implementation Billing inquiry ,
& Maintenance Monitor and control status of Problem
inquiries, and escalate
ndling 1302
Performance Trouble reportrL ha
(QoS & SLA) P Ensure a consistent image
Monitoring ecure use o tems
Performance ,
Finance and P' Customer 00S
Billing complaints Performance
Planning and Other inquiries complaints Management 150
IDesign Billing inquiry
Provider Collections
Customer care Responsesto Mkt. Research
Processes inquiries/orders Feedback/Input

Figure 15
15/129
Receiving a service level
agreement for a hybrid network
customer
I
I F
1602
Storing the service level
agreement
Receiving inquiries from the hybrid 1604
network customers reflecting
occurrences related to the hybrid
network
11MMAMI,
I F
1606
Generating events based on the

service level agreement and at
least one of the customer inquiries
Figure 16
16/129
INPUTS OUTPUTS 1500
1500 us mer 130
Inquiries Inquiry responses
I Scheduled report
Required reportsi Planning
@ I Sales
r er S1,1jILA Terrus ustomer QoS Management Po
Reports
Handling ompletion Schedule customer reports 1502
1502 Notification Receive performance data A 'ons
SL viol
Establish reports to be generated Pran-n-e=* FPFroolblem@
Compile & Deliver customer reports Handling
Problem
Manage SLA Performance 1304
Determine & deliver QoS & SLA Service
ation information :)Os violatio
Quality
Management
Service
Problem
Resolution data 1
1304
Service i
quality Service Class
Managementj Quality Data
1300
@Iher providejr
Wptwark pprfnrmnnrch
Network Data and configuration data
Management
Figure 17
17/129
Receiving a hybrid network event
1802
Determining customer reports to
be generated
i F
1804
Generating the customer reports
based on the hybrid network event
received
Figure 18
18/129
INPUTS OUTPUTS
Constrain
Sales Forecasts capacity
1302
Quality
Service Objectives Service Quality Mgmt.
Planning and Customer QoS
10 Minnnpmpnt
Development Available Life-cycle management of service/ Service clasF@
capacity product portfolio
Monitor overall delivered quality of
Service. Service a service class Service
Probl 1' 1! problem, a 1@
02 t Monitor available capacity/usage
Resol@u ion against forecasted sales Service .@Planning and
Initiate service i provements; modificationp@LDevelopment
m

Customer QoS QcS volati Inform Sales of constraints recommendations
@Management
1300 t er prov er
rovider I Additional
ca ac ra on 1300
Network Data requi
@4anagement Performance/ Credit
Usage trends Violation
I PerformanmL
o Network Data
Usage requests Management
n an
nd scoun n
1306
Figure 19

Receiving a hybrid network event
2002
Determining quality management
network data to be generated
2004
Generating the quality
management network data
2006
Identifying a network process to
which to send the generated
network data for managing service
quality in the hybrid network
architecture
Figure 20

r ustorner 1500
INPUTS OUTPUTS
1500 Trouble report
I m Status reports I
tna emen Trouble Resolution notifica ion 1302
notification I
S
roblern Handling Problem reports jcmustomerrenct)
rSLA
Receive trouble nolifications
Determine cause and resolvelrefer
Track progress ofresolution Service
FConfirguralion]
Initiate action to reconfigure, if needed reconfiguration
not ca on1deta Generate trouble tickets to suppliers
Confirm trouble cleared, notify customer [Other provider
Schedule with and notify customer of
r v r Trouble erl mtrp -1
!e@i@e
Trouble @F 1306
notification' notification
1302 em Trouble
cleared SLA violations
MIc
 Dahge nalification
g and
n
When a trouble is reported by the customer, a trouble report may be sent
to Service Problem Resolution for correctior. When a trouble is
identified by Service Problem Resolution (via Service Quality Management
or Network Maintenance
--and Restoration) then Proble HandIinq
is
n

qtifi
ed
in
order to inform the customer of the p 1919
,
!n
qb
Figure 21

Receiving a notification of a
problem within a hybrid network
I F
2202
Determining a resolution for the
problem Within the hybrid network
2204
Tracking a progress of the
implementation of the resolution
Figure 22

INPUTS 1306 OUTPUTS
Customer record
Order details, discounts
Handling
1504
Service Service prices
Planning/
Development Rating./Discouniting er prov r
Billing records
1502 Apply service rates to usage nvo c ng
I Problem SLA violations Apply negotiated discounts Collecton
Handling QoS violations Apply rebates 1304
Service
1300 er provider T-of lp Quality
Credit violations Mgt.
Network Data Usage information
Management
Figure 23

Receiving customer usage
information for a hybrid network
MUM&=1i 17MIUM,
Collecting network service level
agreement violations
2402
Receiving network quality of
service violations
2404
A
Applying rating rules to the
network customer usage   .
information
WM=Oj1MM=9Mj 2406
Determining negotiated discounts I
based on the network quality of
2408
service violations
IMIM11
Applying rebates based on the
2410
network service level agreement
violations
Providing billin data reflecting the!
2412
usage information, the negotiated

discounts, and the rebates, the
billing data being suitable for
generating a customer invoice

Figure 24

INPUTS 1504 OUTPUTS
Payments
Invoices
us omer Custornor
1500 1500
ustomer
Inquiries IF Cus er
P@ -@) Inquiry Interface
Interface
i Manaaement I nvoicing/Collections Resolution
Manage
Create, delete Create and distribute invoices
customer acct Collect payments Other provide
Handle customer account
Establish Treasury
desired bill date inquiries Accounts and other
Debt Management payable, Financial
1506 Activate billing Bill on behalf of other providers receivable
Functions
(not covered)
records

Figure 25

Receiving customer account
inquiries and customer payment
information
Collecting billing data, the billing 2602
data including discounts due to
quality of service violations, and
rebates due to service level
agreement violations
Creating customer account 2604
invoices for distribution, wherein
the customer account invoices are
based on the customer payment
information and the billing data
1111 1@ I

Figure 26

Provide transfer of media over the
hybrid network utilizing IP
information to route the media
MROMM I law
2702
Generate an event based on QoS of
the media transfer
-@KMMAMW
a 4g
2704
utilize the event to bill for services
provided via the hybrid network

Figure 27

206 28C
2801
E
2804
MAIN
MEMORY
2806

SECONDARY
MEMORY
BUS
2808
HARD DIS
DRIVE
REMOVABLE REMOV
STORAGE DRIVE STORAG'.
2810
Figure 28
MSB LSB
BITS 00 0 1 02 03 04 05 06 07 08 09 10 11 12 13 14 1 5 Figure 29
29/129
MSB LSB
BITS 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 Figu re 30
30/129
MSB LSB
BITS 00 0 1 02 03 04 05 06 07 08 09 10 11 12 13 14 1 5 Figure 31
31/129
MSB LSB
BITS 00 0 1 02 03 04 05 06 07 08 09 10 11 12 13 14 15 Figure 32
32/129
MSB LSB
BITS 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 Figure 33
33/129
MSI3 LSB
BITS 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15
32 T&C GUEST 1 T&C GUEST 2
33 T&C GUEST 3 T&C GUEST 4
34 ID1 ID2 ID3 ID4
35 ID5 ID6 ID7 ID8
36 ID9 ID10 ID11 ID12
37 ID 13 ID14 ID 15 ID16
38 ID 17 ID18 ID 19 ID20
39 ID21 ID22 ID23 ID24
40 ID25 PTD 1 PTD2 PTD3
4 1 PTD4 PTD5 PTD6 PTD7
42 PTD8 PTD9 PTD10 PTD11
43 PTD12 PTD 13 PTD 14 PTD15
44 EIR CALL TYPE OVFAL JCB
45 OVFCL DTA 1 DTA 2 DTA 3
46 DTA 4 DTA 5 DTA 6 DTA 7
47 DTA 8 DTA 9 DTA 10 DTA 11
48 DTA 12 DTA 13 DTA 14 DTA 15
49 OVFC DTAC INCID
50 NETWORK CALL IDENTIFIER (NCID)
51 NETWORK CALL IDENTIFIER (NCID)
52 NETWORK CALL IDENTIFIER (NCID)
53 NETWORK CALL IDENTIFIER (NCID)
54 NETWORK CALL IDENTIFIER (NCID)
55 T&C ROOM I T&C ROOM 2
56 T&C ROOM 3 T&C ROOM 4
57 T&C ROOM 5 T&C ROOM 6
58 EAC1 EAC2 EAC3 EAC4
59 EAC5 EAC6 EAC7 EAC8
60 EAC9 EAC10 EAC11 EAC12
61 OPIN JOVFCS
62 TP5-OPERATOR RELEASE
63 RN1 RN2 RN3 RN4
BIT 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15
Figure 34
34/129
MSB LSB
BIT 00 0 1 02 03 04 05 06 07 08 09 10 11 12 13 14 15 Figure 35
35/129

CALL 3602
4 3608 3612
3606 3610 PRE
ON NATION SLATEI
RFLOW? ADDRESS DIGITS > 10
> 17 DIGITS IN
IGITS?
CALLING
CATION ID> RI"
-i
10 DIGITS? SL
IGITS Ut,-m I
go OSR OR
NO
POSR NO
N'Cl
y S NO NC
S Y S
Y S IlF -Y S
IF
Iz- 3616 /- 361
USE ECDR EPNR EOSR, USE CDR, PNR, OSR,
EPOSR RE60RD FORMAT POSR RECORD
FORMAT
Figure 36
3602 CALL
3702 3704
3700
ME AND
DEBAN RGE FEATU
CALL USED BY C.
PERATOR?
NO NO
N0 YES
USE CDR,, PNR USE ECDR/EPNR USE QSRI POSR USE EOSR/E
RECORD FORMAT RECORD FORMAT RECORD RECORD FOI
FORMAT
3708 0
Figure 37
I F
PROMPT SWITCH
OPERATOR FOR 3802
LOCAL SWITCH TIME
AND
TIME OFFSET FROM
UTC
Yls
DISPLAY ENTERED 3804
TIME AND TIME
OFFSET BACK TO
SWITCH OPERATOR
3806
SWITCH 3810
.0
PERAT R
RIFIED ENTERE NO EXIT
TIME AND TIME
OFFS
Y S
3808
GENERATE SER
WITH EVENT
QUALIFIER = 2
Figure 38
38/129

PROMPT SWITCH
OPERATOR FOR
FORWARD OR 3902
BACKWARD TIME
CHANGE
904
FORWARD TIM BACKWARD
3906 CHANGE?
-,@r 3908
LOCAL SWITCH TIME LOCAL SWITCH TIME =
LOCAL SWITCH TIME + 60 LOCAL SWITCH TIME - 60
TIME OFFSET = TIME OFFSET =
TIME OFFSET + 60 TIME OFFSET - 60
1 T
3910
3914
PERATO
VERIFIED NEW NO EXIT
TIME
D TIME
OFFSET?
3912 GENERATE
SER WITH
EVENT
QUALIFIER = 9
Figure 39
39/129
CEIVE
CALL 4002
4006
GET
ORIGINATING
TRUNK GROUP
PARAMETERS
4010 4022
PROCESS N
RECEIVED *YE CE
NCID
4008
4024
RIGINAT11
TRUNK TYPE -! IM S NCID?
4026 OR RLT?
4016
4012 4034
WRITE
CALL
No, GENERATE RECORD
NCID TO
4014 E
/I-- 4038 4018
40 0
v 4030
WRITE CALL
ADD NCID TO RECORD TO TRANSPORT
CALL RECORD DATABASE CALL
4015 L 403 4028 4020
Figure 40
40/129
4102
NATIN
YES NK TYPE
IMT OR RLT
41 4
GINATINP

ES NK TYPE
ISUP DAL OR
SDN PRI?
4108
4106
DISCARD 4024
NEW YES- RECEIVED
NCID NCID
I
A
4110
4112
KEEP 4f 4026
RECEIVED YES CEIVED NO--w
NCID ID VALID
4026
Figure 41
41/129
4024
4034
v
4202
CALCULATE SEQUENCE
NUMBER
CREATE CALL RECORD WITH 4204
SEQUENCE NUMBER CREATE
NCID WITH SEQUENCit NUMBER
FOR TRANSPORTING TO
DESTINATION SWITCHES
Figure 42
42/129
4304
4026 CODF
FIELD IN &A'i PLACE NCID IN 64
y
i//@- 4306
PLACE NCID IN 32 4040 Figure 43
43/129
YIS
4408
4416
4028
NO- TRANSPORT CALL
DELIVER TO
4402 CID? DESTINATION WITH
GET NCID IN GENERIC
INAT- DIGITS
PARAMETER
ING TRUNK Y OF IAM MSG A
GROUP 1404
PARAMETERS 4418
NK
Isup?
IN
4406
+ 441 10
RMI] TRANSPORT
ATINC CALL TO 4030
NK No-* DESTINATION
ISDN? NORMALLY
A L
S
NO
Figure 44
4414 S

14

TRANSPORT CALL TO
DESTINATION WITH NCID IN
LOCKING CODESET
PARAMETER OF SETUP MSG
44/129
4502
Transmit data over a hybrid
communication system
4504
Obtain a First Event From a CS=
Network Element
4506
Correlate the First Event With a
Second Event Obtained From a PS=
Network Element
4508
Create a Fault Message Based on
the Correlated First and Second
Events
Figure 45
45/129
4626
4646
4632 4630 4628
Notification Reads@ SOL Loader
@ (4644 Script
1602 Aliplinanumeric Pag=e4-
Reads
S Mad Utility New
T Cleuronic mm mess I -F
I !L-?-- Time SOL
0 from Records Direct
Patrol Spooled Job Load
Agents -@UNX Shot
0 ml Script ExeuA@n
0 Patrol 4608 4624-/ 4640
View Generates 4642 Generates
Patrol HP OY Network Oracle
Node Manager
Mew Network Map olification Generale
TImeKey
Patrol Spool Script
View
t604 QVP 41512 AM
API PA interface
API ALdo
462 s External
Action 4638
SNMP Traps Seagate
from Nervecerder c Gatew Oracle
Patrol KMs Object Seryer Gateway
away
rderface
TCPJAP
4610 5NMP
SNMP socket Traps 4620 Socket
Traps
,rem Remedy API
SNMP Gateway
1606 Agents Trapd API Nctcool Interface
MIC VI "w rk Node
Service HP OV NNM 4636
Mordws Werfooe Probe

4618 46 4J 4616 4634
Figure 46
46/129
4702
Monitor The Next Generation
Network
wimml
4704
Determine A Minimum Level of
Service
4706
Sense The Current Level Of
Service
4708
Compare the Current Level of
Service to the with the Minimum
Level of Service
Figure 47
Provide An Indication if the 4710
Current Level of Service is Within
A predetermined Range With
Respect to the Minimum Level of
Service
47/129
4802
Element Software Monitors
Individual Network Elements and
Generates System Events
4804
Element Manager Receives Events
and Filters, Aggregates, and
Correlates the Events
4806
Element Manager Translates the
Events Into Standard Object
Format
4808
Information Services Manager
Receives the Events in Standard
Object Format and Provides the
Events to the Proactive Threshold
Manager
Figure 48
48/129
4902
Monitor The Next Generation
Network
4904
Receive Events From Network
Elements
i Saul 9"WOMWAS191M
W9020
F
4906
Filter and Correlate the Received
Events
4908
Translate the Events Into Standard
Object Format
Figure 49
49/129
5002
Provide Customer Access to
General Technicians
5004

Provide Customer Access to
Expert Technicians
5006
Provide Customer Access to
Solution Experts
Figure 50
50/129
5102
Transmit data over a hybrid
communication system during a
data session
5104
Allow telephonic communication
over the hybrid communication
system during the data session
Route the telephonic 5106
communication over the hybrid
communication system via a user
action
Limit the telephonic 5108
communication over the hybrid
communication system based on a
user profile
@ I I I
Figure 51
51/129
5202
Identify Patterns and Correlations
in System Data
5204
Build a Model of a Behavior of the
Network Based on the Patterns
and Correlations
5206
Predict Future Behavior of the of
the Network Based on the Model
Nam
5208
Manage the Network Based on the
Predicted Future Behavior of the
Network
Figure 52
52/129
5302
5300 5314 5316 5306 5308 5310
z I /, I I
/Security Services Network Services Internet Services
- Page File Transf services
7 Ra'dining (FTP)
cacning ue -C) HTTP
I I
n I
A -r- 1F secure Br W er
-We Web Data Wcb Application
P' "a 0 F ue-fit-yo-f -SeZl-ce-] ervica s-SS L.1 Interface Proto cis
Entt;errfient Entitlement bandwidth) communicatiorfs CGI I NSAPI I ICSAP
E!@
Virtual Private Networki es5-pogi
Web Application Services@
Commerce Content Channels Customer I 1, Cortent Mgmt & Education Si
Relationship Mgmt Publishing Services
F-C2@;Ioll @Czp2bilfit@s@ F unte -(Pn-ca-97 FCoritent Diweloprineru
FCunriculum Car, (produi:s seevices) Availability) Ullwiticiall
Caip200jties ChatCapalblties Uzar,Pnoli'o Mgm)lj
lncal-tirne) (Act ve Profilir@ Marketuill Cull

a
F co7wrti Management
F Push Teclundogy Dyn imically facilitate -egi
FG-er-er-a t-e Twaffinatefl FR ster lot tra
I Ttao@tablourM
capabilities d=s communities of Interesl Capabilifies Order Train
Discu Delive it
F Tax & Shipping essforol' FVanage : airMece7ip MalchW onlen
in ifi@)inbound s peci if C Ue st)ecr profi lc@o
Calculations wSg UPS) s Cor,:ent Approval
Ilynampc in, @& Coment Workilow
i rCustomer Feedback
7Compare Products 17 FTransac @ion ocessin
Services Capabij=hYsicaf Content Subsindridon! e latlMd SuNeys
e C) publishing) Emning --ACCDur
Ne;Ts Assessment 1@ F ectronc7-icense
BuyerAssistant =n Os Events. Cate Re= S
F4
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L@Iizatkfn I
n
'ion Capabi
Admini3tratiye T, sit
Shareholder Service
& Miscellanea, us
P Advertisement & r Lead Generation & TeUi Rendering
icirfiftion Capabiliti n] CaPdbil ides
Auction Capabilities
5304 & Deployne-nIt
.Tools
Common Web Services
D2ta Son,,Icoc Integration Co pabilities 7rrrP-any me-qU rio-n@ L-'Ca
Capa:i,iilies -Miscollanom
to'
Capabilities (Content. Channel Pahncn, Ed.
5324 Training) Centers
Streaming Vi@
Application Data jvm
F F Human Resources FTFwSaction ntegraTon
Audio Calpabil@itias&] HE
Directory Services Managerint Operations Web
I nl T,
K Storage of Base Protii Fmarsteement 9 stonige F--7CF, -g uirati-on--j
F-We-TXpFp i "cal c
FVaTjTa-fl ort-Wa-n-ag-emen-tj F Auditing & Billing for@ Corn rn Un
02 of Network Obj=t Data (Charge-ba4kl, =:,nl (iDifyeic@"`hed c04
Usage criptin an
F Log Anal/srs FRedundancy) Backu@p F WebApplicaflon F Web Applicalic
5328 F-A-ssignment of User F Web Performance
Profit" to Communities Capabifiles Monitoring Capati Icapabilities 52ging
Debugging Utilit
vyet, Applicallic
bdttbes,51cne, Revision Conlir
Ruln&Policy F-WelTTp-p-Kdmrn7-j
Management Jr
LIPlan a saini system
53 2 5330
Figure 53
FACILITATINGPURCHASEOFATLEASTONEOFPRODUCTSANDSERVICESVIAA
DISPLAYED CATALOG
5402
OUTPUTTING DATA RELATING TO AT LEAST ONE OF THE PRODUCTS AND SERVICES
b4U4
OUTPUTTING A COMPARISON BETWEEN DIFFERENT PRODUCTS AND SERVICES,,@
RECEIVING DATA RELATING TO USER REQUIREMENTS AND OUTPUTTING A 5406

RECOMMENDATION OF AT LEAST ONE OF THE PRODUCTS AND SERVICES BASED
ON THE INPUTTED DATA
1 08
SELECTING FEATURES OF AT LEAST ONE OF ,THE PRODUCTS AND SERVICES
BASED ON A USER PROFILE
I
ADVERTISING AT LEAST ONE OF THE PRODUCTS AND SERVICES 5410
5412
OUTPUTTING AN ESTIMATE RELATING TO AT LEAST ONE OF A PRICE AND AN
AVAILABILITY OF AT LEAST ONE OF THE PRODUCTS AND SERVICES
1 5414
PROCESSING AN ORDER FOR AT LEAST ONE OF THE PRODUCTS AND SERVICES
55,4 16
CALCULATING AT LEAST ONE OF A TAX AND A SHIPPING FEE FOR AT LEAST ONE
THE PRODUCTS AND SERVICES FOR WHICH THE ORDER IS PROCESSED
5418
OWTPUTTING A STATUS OF DELIVERY FOR AT LEAST ONE OF THE PRODUCTS A
SERVICES FOR WHICH THE ORDER IS PROCESSED
5300 Figure 54
54/129
DISPLAYING A PLURALITY OF ITEMS FOR PURCHASE 5500
ALLOWING A USER TO SELECT A PREDETERMINED SET OF THE ITEMS FOR
PURCHASE
5502
ACCEPTING PAYMENT IN EXCHANGE FOR THE PREDETERMINED SET OF ITEMS 5504
STORING THE PREDETERMINED SET OF ITEMS 5506
ALLOWING THE USER TO COLLECTIVELY SELECT THE PREDETERMINED SET OF
ITEMS AT A LATER TIME WITHOUT HAVING TO SELECT EACH OF THE ITEMS
INDIVIDUALLY
5508
Figure 56.
55/129
DEVELOPING A USER PROFILE
5601
DISPLAYING A PLURALITY OF ITEMS FOR PURCHASE
5602
ALLOWING A USER TO SELECT A SET OF SIMILAR ITEMS TO COMPARE
5603
DETERMINING A SET OF FEATURES OF THE SIMILAR ITEMS
5604
UTILIZING THE USER PROFILE TO DETERMINE A HIERARCHY OF THE
FEATURES
5605
PRESENTING THE FEATURES IN A PRIORITIZED MANNER IN
ACCORDANCE WITH THE HIERARCHY
5404
Figure 56
56/129
PREASSOCIATING THE FEATURES WITH FEATURE KEYWORDS 5700
A COMPARISON OF THE FEATURES BASED ON KEYWORD TAKEN FROM 5701
THE CUSTOMER'S PROFILE
GIVINGAFEATUREPRIORITYWHENAKEYWORDINPUTBYTHEUSER 5702
MATCHES A FEATURE KEYWORD,
GIVING FEATURES WITH FEATURE KEYWORDS HAVING MULTIPLE 5703
MATCHES HIGHEST PRIORITY AND RANKING THE FEATURES
ACCORDING TO THE NUMBER OF MATCHES
ANALYZING THE USER'S WORDS USING A THESAURUS TO FIND 5704
KEYWORD MATCHES IF NO KEYWORDS MATCH
5614
Figure 57
57/129
. ...
ANALYZING USER REQUIREMENTS
5802
I F

REVIEWING AVAILABLE PRODUCTS
5804
GENERATING AT LEAST ONE RECOMMENDED SOLUTION BASED ON THE USER 5806
REQUIREMENTS
-"J
I F
DISPLAYING THE AT LEAST ONE RECOMMENDED SOLUTION
5808
ACCEPTING PAYMENT IN EXCHANGE FOR THE AT LEAST ONE SOLUTION
Figure 58 5810

PREASSOCIATING ITEMS WITH KEYWORDS
SELECTING ITEMS BASED ON KEYWORD TAKEN FROM THE USER 5902
INPUT
5904
DISPLAYING AN ITEM WHEN A KEYWORD INPUT BY THE USER
MATCHES A KEYWORD ASSOCIATED WITH THE ITEM
IF NO KEYWORDS MATCH, ANALYZING THE USER'S WORDS USING A 5906
THESAURUS TO FIND KEYWORD MATCHES
Figure 59
5806

DISPLAYING A PLURALITY OF ITEMS FOR PURCHASE, WHEREIN EACH OF THE ITEMS
INCLUDES A PLURALITY OF AVAILABLE FEATURES
6002
DISPLAYING THE AVAILABLE FEATURES OF THE ITEMS
6003
ALLOWING A USER TO SELECT THE AVAILABLE FEATURES OF EACH OF THE ITEMS
TO BE PURCHASED 6004
6006
DETERMINING A PRICE AND AVAILABILITY OF THE SELECTED ITEMS AND THE
SELECTED FEATURES THEREOF AND DISPLAYING THE SAME
ACCEPTINGPAYMENTINEXCHANGEFORTHESELECTEDITEMSANDTHE
SELECTED FEATURES THEREOF 6008
Figure 60

DISPLAYING A PLURALITY OF ITEMS FOR PURCHASE 6102
DISPLAYING ADVERTISEMENT INFORMATION WHICH RELATES TO AT LEAST ONE OF
THE ITEMS DISPLAYED FOR PURCHASE 6103
I
F
ALLOWING A USER TO SELECT THE ITEMS FOR PURCHASE
6104
F
ACCEPTING PAYMENT IN EXCHANGE FOR THE SELECTED ITEMS
6106
Figure 61

PREASSOCIATING ADVERTISEMENTS WITH INDIVIDUAL ITEMS OR WITH
ENTIRE CLASSES OF ITEMS
AUTOMATICALLY DISPLAYING ONE OR MORE OF THE 6202
ADVERTISEMENTS WHEN THE ITEMS ARE SELECTED FOR DISPLAY
ROTATING THE ADVERTISEMENTS SO THAT EACH GETS AN EQUAL 6204
AMOUNT OF DISPLAY TIME, OR ACCORDING TO THE PREMIUM PAID B
THE ADVERTISER
Figure 62
6103

CREATING A USER PROFILE FROM INFORMATION ABOUT A USER
6302
F
6304
SELECTING AT LEAST ONE ITEM FOR PURCHASE BASED ON THE USER PROFILE
6306
IDISPLAYING THE AT LEAST ONE ITEM FOR PURCHASE

ALLOWING THE USER TO SELECT THE AT LEAST ONE ITEM FOR PURCHASE
6308
ACCEPTING PAYMENT IN EXCHANGE FOR THE SELECTED ITEM
Figure 63
6310
63/129
ALLOWING A USER TO REQUEST TO UTILIZE A SOFTWARE PACKAGE 6402
I F
PROMPTING THE USER TO ENTER USER INPUT RELATING TO THE USER
6404
'RECEIVING THE USER INPUT RELATING TO THE USER
6406
GENERATING A LICENSE AGREEMENT UTILIZING THE USER INPUT
6408
SENDING THE LICENSE AGREEMENT TO THE USER
Figure 64 410
64/129
SETTING FOR I H THE TERMS OF THE LICENSE AGREEMENT
6501
SETTING FORTH LICENSOR IDENTIFICATION INFORMATION
6502
SETTING FORTH LICENSEE (USER) IDENTIFICATION INFORMATION
6503
VERIFYING IDENTIFICATION
Figure 65
6408
65/129
czcznn
DOWNLOADING DATA -----
6602
TRANSMITTING DATA BASED ON USER SPECIFICATIONS
b604
PROVIDING A PLURALITY OF NEWSGROUPS TO WHICH USERS SUBSCRIBE
I 7-d!
OUTPUTTINGANSWERSTOFREQUENTLYASKEDQUESTIONSRELATINGTOTHE 6606
CONTENT-RELATED WEB APPLICATION SERVICES
6608
ENABLING REAL TIME COMMUNICATION BETWEEN A PLURALITY OF THE USERS
COORDINATING THE TRANSMISSION OF ELECTRONIC MAIL 661
0612
ORGANIZING RECEIVED ELECTRONIC MAIL
PROVIDING A PLURALITY OF TEMPLATES FOR PUBLISHING DATA IN VARIOUS 6614
FORMS
5302
Figure 66
66/129
MANAGING PROFILE DATA OF A PLURALITY OF USERS
i 6702
PROVIDING INFORMATION OF INTEREST TO EACH USER BASED ON THE PROFILE
DATA OF THE USER
i@
04
PROVIDING INFORMATION OF INTEREST TO A PLURALITY OF USERS HAVING
SIMILAR PROFILE DATA
COLLECTING FEEDBACK FROM THE USERS ON THE PROVIDED INFORMATION 6706
i
PROVIDING A SERVICE SELECTED FROM A GROUP OF SERVICES INCLUDING: 6708
MAINTAINING A CALENDAR OF UPCOMING EVENTS, REMINDING THE USERS OF THE
UPCOMING EVENTS, AND ALLOWING REGISTRATION OF THE USERS FOR THE
UPCOMING EVENTS
5306
Figure 67
67/129
DEVELOPING A USER PROFILE
DISPLAYING AN ITEM FOR PURCHASE WITH A SET OF FEATURES 6801

CUSTOMIZING THE PRESENTATION OF THE SET OF FEATURES BASED 6802
ON THE USER PROFILE
ALLOWING A USER TO SELECT THE ITEM FOR PURCHASE 6803
6700 Figure 68
68/129
COLLECTING USER INFORMATION SUCH AS SEARCH REQUESTS,
SHOPPING EVENTS, AND BROWSING HABITS
6901
PLACING ALL OF THE USER INFORMATION IN A DATABASE FOR
RETRIEVAL WHEN NECESSARY
02
ESTIMATING A USER'S BUYING PATTERN FOR A PARTICULAR TYPE OF
ITEM EACH TIME A USER USES THE SYSTEM
6903
LOGGING THE USER'S CURRENT ACTIVITIES AND ENTERING THEM
INTO THE DATABASE
Figure 69
6810
69/129
nnn
DEVELOPING CONTENT OF A DATA INTERFACE FOR ACCESSING DATA ON A
NETWORK
UU
MANAGING THE CONTENT OF THE DATA INTERFACE
I
APPROVING THE PUBLICATION OF THE CONTENT BEFORE TRANSMISSION OF THE
CONTENT
I
TESTING THE CONTENT OF THE DATA INTERFACE 7006
5308
Figure 70
70/129
GENERATING A CURRICULUM OF COURSE OFFERINGS
7102
ALLOWING THE SELECTION OF THE COURSE OFFERINGS
104
EDUCATING USERS OVER A NETWORK
i 7106
DISPLAYING A STATUS OF THE EDUCATION OF THE USERS INCLUDING AT LEAST
ONE OF THE COURSES COMPLETED AND SCORES FOR THE COURSES COMPLETED
5310
Figure 71
71/129
ALLOWING A USER TO REVIEW EDUCATIONAL PROGRAM OFFERINGS 7200
7201
PROMPTING THE USER TO ENTER USER INDICIA
7202
RECEIVING THE USER INDICIA
7203
GENERATING A USER PROFILE BASED ON THE USER INDICIA
7204
GENERATING AN EDUCATION CURRICULUM BASED ON THE USER
PROFILE
71 0 0
Figure 72
72/129
GENERATING THE EDUCATION CURRICULUM BASED ON THE CURRENT 7300
EXPERTISE
RECEIVING STUDENT DEFINED TRAINING GOAL, SUCH AS A SPECIFIC 7301
CERTIFICATION OR DEGREE (ADDITIONAL USER INDICIA),
7302
TAKING THE TRAININ

G GOAL FROM THE STUDENT PROFILE
GENERATING THE EDUCATION CURRICULUM TO FULFILL THE TRAINING 7303

GOAL

MONITORING THE STUDENT'S PROGRESS AND PRODUCING REVISED 7304
EDUCATIONAL CURRICULUMS

7203

Figure 73

73/129

ALLOWING REGISTRATION OF A PRODUCT

7402

PROVIDING SUPPORT INFORMATION ON THE PRODUCT BASED ON QUERIES

404

HANDLING CLAIMS RELATING TO THE PRODUCT

I

AUTOMATICALLY NOTIFYING USERS OF AT LEAST ONE OF UPGRADES AND 740
PROBLEMS RELATING TO THE PRODUCT

5312

Figure 74

74/129

PROVIDING COMMERCIAL OFFERINGS FOR A USER TO REVIEW

7501

ALLOWING THE USER TO SELECT FROM THE COMMERCIAL OFFERINGS

7502

PROMPTING THE USER TO ENTER USER INDICIA

7503

RECEIVING THE USER INDICIA

7504

COMPLETING SALE AND DELIVERY OF THE COMMERCIAL OFFERING

MONITORING THE STATUS OF THE COMMERCIAL OFFERINGS UTILIZING 7505
THE USER INDICIA

COMMUNICATING WITH THE USER THE STATUS OF THE COMMERCIAL 7506
OFFERINGS

7406 Figure 75

75/129

ALLOWING BROWSER-BASED AUTHENTICATION WITH USER
VERIFICATION DATA

GRANTING ACCESS TO AT LEAST ONE OF APPLICATION AND SYSTEM 7602
DATA BASED ON THE USER VERIFICATION DATA

7604

ENABLING VIRTUAL PRIVATE NETWORKING

Figure 76

5314

76/129

C

CACHING CONTENT OF A NETWORK ------

I 7702

PROVIDING APPLICATION PROXY SERVICES ON THE NETWORK

7104

MANAGING RESOURCES OF THE NETWORK --dN@

I

MANAGING NETWORK OBJECTS ON THE NETWORK 770

170

CONTROLLING AT LEAST ONE OF BANDWIDTH AND SPEED OF THE NETWORK

ENABLING REMOTE ACCESS SERVICES ON THE NETWORK 7710

7712

AFFORDING FIREWALL SERVICES ON THE NETWORK

Figure 77

6316

77/129

PROVIDING HTTP PAGE RENDERING OVER A NETWORK FRAMEWORK 7800

ENABLING SECURE BROWSER COMMUNICATION OVER THE NETWORK 7802
FRAMEWORK

I

AFFORDING ELECTRONIC MAIL TRANSPORT SERVICES OVER THE 7804
NETWORK FRAMEWORK

7806

PROVIDING FILE TRANSFER SERVICES OVER THE NETWORK

FRAMEWORK
7808
GATHERING AND LOGGING INFORMATION OF ONLINE EVENTS DURING
ONLINE SESSIONS OVER THE NETWORK FRAMEWORK
INTERFACING APPLICATIONS VIA PREDETERMINED PROTOCOLS OVER 7110
THE NETWORK FRAMEWORK
Figure 78
5318
78/129
MANAGING CLIENT VERIFICATION DATA FOR USER AUTHENTICATION PURPOSES IN
A NETWORK FRAMEWORK
90
PROVIDING ELECTRONIC MAIL CAPABILITIES IN THE NETWORK FRAMEWORK
ENABLING NETWORK FRAMEWORK BROWSING IN THE NETWORK FRAMEWORK/@@,,@
OUTPUTTING ANSWERS TO FREQUENTLY ASKED QUESTIONS RELATING TO THE 7906
CONTENT-RELATED WEB APPLICATION SERVICES
79
PROVIDING NEWS READER CAPABILITIES IN THE NETWORK FRAMEWORK
AFFORDfNG CHAT ROOM CAPABILITIES IN THE NETWORK FRAMEWO
RK
@7@91 0
-7912
ENABLING PLAYBACK CAPABILITIES IN THE NETWORK FRAMEWORK
PROVIDING FINANCIAL TRANSACTIONAL CAPABILITIES IN THE NETWORK 7914
FRAMEWORK
5320
Figure 79
79/129
PROVIDING DATA ACCESS FROM MULTIPLE SIMULTANEOUS DATA
SOURCES OVER A NETWORK FRAMEWORK
8002
STORING APPLICATION DATA OVER THE NETWORK FRAMEWORK
Figure 80
5324
80/129
INTEGRATING FINANCIAL SYSTEMS OVER A NETWORK FRAMEWORK 8100
IMPLEMENTING SALES FORCE INTEGRATION OVER THE NETWORK 8102
FRAMEWORK
8104
COMBINING HUMAN RESOURCE SYSTEMS OVER THE NETWORK
FRAMEWORK
v
INTEGRATING CALL CENTERS OVER THE NETWORK FRAMEWORK 8106
5812 Figure 81
81/129
/ 8200
PROVIDING LOCATOR CAPABILITIES OVER A NETWORK FRAMEWORK
TRANSMITTING AT LEAST ONE OF STREAMING VIDEO AND AUDIO DATA 8202
OVER THE NETWORK FRAMEWORK
8204
LOGGING EVENTS OVER THE NETWORK FRAMEWORK
PASSIVELY MANAGING USER PROFILE INFORMATION OVER THE 8206
NETWORK FRAMEWORK
5326 Figure 82
82/129
wann
VALIDATING USER PROFILE DATA IN A SYSTEM ------
-302
MANAGING THE USER PROFILE DATA IN THE SYSTEM
8304
STORING THE USER PROFILE DATA IN THE SYSTEM
MANAGING NETWORK OBJECT DATA IN THE SYSTEM 8306
STORING THE NETWORK OBJECT DATA IN THE SYSTEM 8306
ASSIGNING OF COMMUNITY PROFILE DATA TO A COMMUNITY INCLUDING A
PLURALITY OF USERS IN THE SYSTEM 8310

8312
VALIDATING COMMUNITY PROFILE DATA IN THE SYSTEM -3!
I
MANAGING THE COMMUNITY PROFILE DATA IN THE SYSTEM 8314
STORING THE COMMUNITY PROFILE DATA IN THE SYSTEM 8316
5328
Figure 83
83/129
AUDITING ADMINISTRATIVE DATA IN A SYSTEM ------
8402
ANALYZING DATA FROM LOG FILES IN THE SYSTEM
i
MANAGING RULES AND POLICIES IN THE SYSTEM
i
AUDITING USAGE IN THE SYSTEM 8406
BILLING FOR THE USAGE IN THE SYSTEM 8408
MONITORING PERFORMANCE IN THE SYSTEM 8410
MANAGING COMMUNITIES OF USERS IN THE SYSTEM 8412
PROVIDING BACKUP CAPABILITIES IN THE SYSTEM 8414
PROVIDING NETWORK APPLICATION STAGING IN THE SYSTEM 841
5330 Figure 84
84/129
/ 8500
PROVIDING DEVELOPMENT TOOLS FOR SYSTEM APPLICATIONS
8502
DEBUGGING THE SYSTEM APPLICATIONS
CONTROLLING THE GENERATION OF REVISIONS OF THE SYSTEM 8504
APPLICATIONS
8506
TESTING THE OPERABILITY OF THE SYSTEM APPLICATIONS
5332 Figure 85
85/129
8600 8602
Existing
Business IT Guiding
Architecture and I mperatives Principles
Infrastructure
H
Identify
echnology
en
8700
Figure 86 8702 8704
131. The client needs to reach a new ex" dience
vAth this application.
B2. The client needs to reach a large or:rSae,
internal audience vAth this application.
Business
Imperatives
I and
Infrastructure
D. OtherNetwork-Centdcapplicationshavebeen
developed and placed in production. G1. The client is an early adopter of
new technology. E1. The client has significant technology skills Wthin
its IT G2. Applications should be developed to handle non department.
dedicated or occasional users. E3. The client has rnultiple
hardvore/operating system (33. Where appropriate, applications should be
developed oonfigur2tions for their client machines. vAth mull-media
capabilities for the presentation of data itext, sound, video, etc.). E4.
The application will run on a device other than a PC. 64. The Execution,
Operation and Development E5. The current legacy systems can scale to
serve a architectures will be designed to support frequent potentially
large new audience. releases of enhanoerrents/modificaHons to production
applications.
Figure 87

8802

Business Imperatives	B1. The application will be used only by an internal user community.
	52 The application requires an advanced, dynamic, and integrated user interface for expert users.
	B3. Session performance is critical to the application or sub-second response times are required for successful use. 8804
	B4. The application needs to support offline, mobile users.

Existing Client Server Architecture and Infrastructure	IT Guiding IArchitecture PrincZ@S@

-- .. . - - J

E1. Other Client Server applications been G1. The client maintains their applications
developed and placed in production internally and the IT department has
and the client IT organization the necessary resources.
contains personnel familiar with client organizations and processes to
server architecture concepts. maintain a Client Server application.

Figure 88

8900 8904

8902

ication will only be used by a

Business B1. The ei
Imperatives dedicated, expert user community whe
an intuitive interface is not needed.
B2. The application requires a h1gh volume 0
repetitive transactions.
83 The application has a requirement
significant batch processing.
134. End users can maintain a physical
connection to the host at all tirneE
135. The application will need to suppor e
number of users (>1000).

Existing
Architectur and 6 IT Gu n
e
Infrastructure Architecture Principle
J

E1. The client currently maintains and G1. The Client has the resources,
organizations and operates host based applications processes necessary
for the development and and the IT organization contains operation of a
Host based application.
personnel familiar with the
development and operation of these G2. Reliance upon a single vendor
(IBM) for types of applications. technology solutions is acceptable.
G3. Centralized application and data is an accopted
strategy,

Figure 89

9006 9008 9090

Relationship 9016
Management
9002 Maintenance & Administration
Decision
7' Support
External Order Processing
Agents
Integration
Customer Services
9004,"@. Electronic

Merchandising 9018
Security
9014 9012
Figure 90
9102
9106
r- n c Buyer-Centric Auction
n Solution (Broker)
Solution
CD
e ornmerce Application & Iling els 0
9000 9
3
eCommerce
Internet
Applications
Maps to
Products
0
eCommerce
TranS2ctional
Infrastructure
Enabling Technology
9104 e)
Figure 91

9202
RECEIVING A REQUEST FOR A SERVICE OVER A NETWORK
F
9204
SEARCHINGINFORMATIONONTHENETWORKINORDERTO
PERFORM THE SERVICE
9206
SELECTING DATA FROM THE INFORMATION ON THE NETWORK
PERFORMING THE SERVICE UTILIZING THE DATA, WHEREIN THE 9208
INFORMATION ON THE NETWORK IS INFORMATION ABOUT A
PRODUCT AND THE DATA SELECTED FROM THE INFORMATION IS
A PRICE OF THE PRODUCT
Figure 92

9402
DISPLAYING INFORMATION OF A PRODUCT INCLUDING AT LEAST
ONE OF PRODUCT SPECIFICATIONS, GRAPHICS, VIDEO IMAGES,
DIGITAL SAMPLES, AND INVENTORY AVAILABILITY
9404
PROVIDING A SEARCH MECHANISM FOR SEARCHING FOR ITEMS
SIMILAR TO THE PRODUCT OVER A NETWORK
94 6
SUGGESTING THE ITEMS SIMILAR TO THE PRODUCT
9408
ALLOWING SELECTION OF THE PRODUCT AND THE ITEMS
SIMILAR TO THE PRODUCT FOR PURCHASE OVER THE NETWORK
Figure 94

9300
Figure 93
9004
Equivalent 9508
Itern!
Product
Comparison 9510
Dynamic
Pricing
9512
Product Search -N@-/

10/23/02 9:08 AM

9514
Product
Sampling
9516
Customer
Product 9504
Configuration
9502 Information lnformat@on Information
Storage Delivery Staging 9506
9500 Product Information
Figure 95

9602
IDENTIFYING A USER
9604
COLLECTING INFORMATION ABOUT THE USER
9606
BUILDING A PROFILE OF THE USER BASED ON THE COLLECTED
INFORMATION
9608
MANAGIN G A PLURALITY OF DIFFERENT CONTENTS
ANALYZINGTHEPROFILEANDTHECONTENTSINORDERTOMATCH 9610
ATTRIBUTESOFTHEPROFILEOFTHEUSERANDATTRIBUTESOF
THE CONTENTS
9612
SELECTING THE CONTENTS WHICH HAVE ATTRIBUTES THAT MATCH
THE ATTRIBUTES OF THE PROFILE OF THE USER
9614
DELIVERING THE SELECTED CONTENTS TO THE USER
9616
ALLOWING THE USER TO MANUALLY SELECT WHICH OF THE
DELIVERED CONTENTS ARE DEPICTED ON A DISPLAY
9618
ALLOWING THE USER TO SELECTIVELY POSITION THE DELIVERED
CONTENTS ON THE DISPLAY
Figure 96

9710
Identification 730
9712,
@@l Customer
Selection
Information Capture
9714
Content Catalog 9732
Matching Logic Customer
9718 Acquisition
Content Merge & Delivery
`,-+ 7
9720 9734
Administration
Customer
Personalization Extension
9736
9700 Customer
Retention
Interactive 9702
Figure 97 Marketing
9700
9714
9710 9712 T
DATA WAREHOUSE
CONTENT CATALOG
IFICATION
z

RMATI w X
CAPTUR 2 w
w
< HTIVILPAGES INFORMATION
TCHING 41 <
z
User n. LOGIC w
EL
w < z z
w 0 "41 @1
C 0
P
z @ 0
0
MERGE 0
DELI PRODUCTS GRAPHICS
9716
9718
9720
Figure 98
93/129
9902 9904 9910
ITERATIVE ITERATIVE
IDENTIF
U
M
INFORMATIO
N
CAPTURE 0
Z
OPTIMIZE >
MATCH
0
Z
USER
9906
Figure 99
10000
10002
No Limited
CUStOrni= Gustomizatl
No personalization User-controlled Site-controlled
Mass marketing (simple) personalization
Standard product choices personalization. Individual (real-time)
Static in nature Targetted marketing marketing
Limited product Products configured
hoices geared to to the individual
known/static Dynamiclautomated
demographics in nature
Dynamic
Figure 100
94/129
10102 10106
CONTENT CATALOG
z
2 x
z
HTMLPAGES INFORMATION
z
Uj
z z
Uj 0
z
0
PRODUCTS GRAPH

10104
Figure 101
10200
SITE NAVIGATION @D Z3 ZJ
10202
DCAl
STATIC CONTENT
DYNAMIC
CONTENT
AREAS
10204
DCA2
10206
DCA3
Figure 102
HTIVIL TEMPLATE
95/129
MONITORING OPERATION OF ENTITIES SELECTED FROM THE 10402
GROUP CONSISTING OF SERVER PROCESSES, DISK SPACE,
MEMORY AVAILABILITY, CPU UTILIZATION, ACCESS TIME TO A
SERVER, AND A NUMBER OF CONNECTIONS IN AN E-COMMERCE
SYSTEM
r
UPDATING ITEMS SELECTED FROM THE GROUP CONSISTING OF 10404
MERCHANDISING CONTENT, CURRENCY EXCHANGE RATES, TAX
RATES, AND PRICING IN THE E-COMMERCE SYSTEM AT
PREDETERMINED INTERVALS
10406
SYNCHRONIZING EXTERNAL DATA STORED SEPARATELY FROM
THE ECOMMERCE SYSTEM WITH INTERNAL DATA STORED ON
THE E-COMMERCE SYSTEM
10408
MANAGING CONTACT INFORMATION RECEIVED FROM USERS OF
THE E-COMMERCE SYSTEM
10410
ALTERING THE ITEMS BASED ON PROFILES OF THE USE
THE E-COMMERCE SYSTEM
Figure 104
96/129
Selection 9730
9734 9732
What criteria determine who
will be the most profitable
customers?
Extension Acquisition
$$$
Time
Retention can we acquire this
How can we increa GUStOrfler in the most efficient
loyalty and profilia and effective way?
of this custome
9736
How Gan we keep this
customer for as long as
possible?
Figure 103
9008
System Marketing & Contact Data Personalization
Maintenance Merchandising Management Administration Maintenance
Administration
10506
1 @0502
0500 10504
Figure 105
97/129

- 10702
DISPLAYING INFORMATION ABOUT A PRODUCT FOR SALE
10704
RECEIVING AN ORDER FOR PURCHASE OF THE PRODUCT
DYNAMICALLY GENERATING A PRICE OF THE PRODUCT FOR SALE 10 06
BASED ON THE ACTUAL PRICE OF THE PRODUCT AND AT LEAST ONE
OF DISCOUNTS, TAXES, FULFILLMENT COSTS AND DELIVERY COSTS
10708
ALLOWING SAVE AND RECALL OF THE PRODUCT AND PRICE OF-THE
ORDER
10710
DETERMINING A METHOD OF PAYMENT
10712
RECEIVIN G THE PAYMENT
10714
FULFILLING THE ORDER
Figure 107
98/129
Merchandise Check Out Payment Fulfillment
Selection
10600 10602 10604 10606
Figure 106
10800 10802
Browse eec r
erchand- es mer
Interact
se
-No
Yes..
Price negotiation Chock-out
Payment Integrity check
authorization
Warehouse Status update
modification
10804
Settlement Fulfillment
Figure 108
99/129
1 02
PROVIDINGANABILITYTOSEARCHFORINFORMATIONONTHE
NETWORK VIA A SITE
I F
10 04
DISPLAYING ORDER TRACKING INFORMATION FOR TRACKING Al
ORDER VIA THE SITE
06
ALLOWING RETURN OF A PRODUCT VIA THE SITE, WHEREIN A
PURCHASE PRICE IS REFUNDED TO A CUSTOMER
EXECUTING A TRAINING APPLICATION PROGRAM FOR TRAINING A @708
CUSTOMER IN USE OF THE SITE OVER THE NETWORK
Jr
INTERACTINGWITHTHECUSTOMERINREAL-TIMEVIATHESITE
BY ALLOWING THE CUSTOMER TO COMMUNICATE WITH A
CUSTOMER SERVICE REPRESENTATIVE OVER THE NETWORK
Figure 109
100/129
Ord!r Return/ Help & Tro ble
Site Search merchandise Information S o ng
Tracking hout!
Credit
110DO 11002 11004 11006 11008
Figure 110
9014
Secure Secure Secure Secure
Communication Environment Secure Data Client Server

Environment Environment
11100 11102 104 106 08
Figure 111
101/129
11202
ATTACHING A MESSAGE DIGEST TO DATA PRIOR TO A
TRANSMISSION FOR DETERMINING WHETHER THE DATA WAS
MODIFIED AFTER BEING SENT BY A USER
I F
11204
ENCRYPTING THE DATA FOR PREVENTING UNAUTHORIZED
ACCESS TO THE DATA DURING THE TRANSMISSION
I F
11 06
SENDING AUTHENTICATION INFORMATION WITH THE DATA IN THE
TRANSMISSION FOR VERIFYING AN IDENTITY OF THE USER
11208
SECURING A CLIENT ENVIRONMENT BY USING AUTHORIZATION
MODELS TO DETERMINE WHICH ENTITIES CAN ACCESS SPECIFIC
APPLICATIONS, DATA, AND RESOURCES ON A CLIENT
I F
11210
SECURING A SERVER ENVIRONMENT BY IMPLEMENTING A
FIREWALL
Figure 112
102/129
Ca Web
Server 11300
Database
filte
Router
aient
Adrninistration Figure 113
11402
*Hardened 05 eHandened OS Hardened OS 11410
on
11404 11400
Database
revo I
Router
,Ha
1 1406 Internet
Adninistration 1 1 08 Figure 114
103/129
11506
Corporate Headquarters
Fs Remote Users
Server
UNIX Clienj n ase
Server
F
C c Customers
Ionrtpa
rewa
Local Office
cat on
r r
Client Client Oient Olent
11500
11504
Figure 115
104/129
11600
Corporate Headquarters 11606
elda FrP Remote Users

Serv F:ncD@Ption software
RA
rksta on UNIX n n rne ,pA AC W@@Ap Access Cont'
are Smart
LDAP Applica on ase Web 11604 Card
Server Serve IN Reader
rporate 11608 customer,
Intranet
A
Local Office
Software
cat on Web we
Server Se
Softwa
Client Client Client Clie
Figure 116

105/129

11700 Email
Server
nternet rewa Database
Dial-up
lent
Web t
Server
Customer Support
Personaliza News Representative
tion Server Server Workstation
Figure 117
11808
11800 11806 11804
Ernai
Serve
Database
n e Pac t Fite Firewa
Di Router
Clien ardened-US
rv
11802 rt
Customer Support
Representative Figure 118

106/129

11900 11902
Internet Packet filte Firewall
Dial-up Router
(lient
ric on
r
Figure 119
*Customer Pi
CA 12008
12006
PKI Service Provider 12010 12002
rt cate Hardened 05 Hardened OS sHardene
r e rewa 0 e PP Ca
> i3f- P Router Server Firewa
12000
erver e ric
rtificate Se
Figure 120
sHard 12004
12104
12102
ca on
Ap n
Database

Electronic Commerce LAN Firewall Packet filt
Router
eve o ment n
rv nternet
Dial-up
tion Ms Merchant en t Servi
Database LAN Nelwork
Figure 121
12206 12202
*Hardened OS oHardened OS H OS oHardened OS
P t We
atab Server Server 12204
Au Server
RA 0 cate Ss ment Staging
Server
u ment Firewall
Administration Systems Encryptic
Ipayment
12208 i
egacy Merchant
Database LAN Nt
Figure 122
12 02
PROVIDING AN E-COMMERCE APPLICATION WHICH ALLOWS THE
PURCHASE OF PRODUCTS OR SERVICES
RECEIVING INFORMATION ABOUT A CUSTOMER FROM THE E- 04
COMMERCE APPLICATION, WHEREIN THE INFORMATION
INCLUDES AN AMOUNT OF PURCHASES MADE BY THE CUSTOMER
AND TIMES AT WHICH THE PURCHASES OCCURRED
ANALYZING THE INFORMATION 06
1 08
STORING THE ANALYSIS OF THE INFORMATION ABOUT THE
CUSTOMER
12310
PROVIDING A DECISION SUPPORT SERVICE FOR MANAGING THE
E-COMMERCEAPPLICATIONBASEDONTHEANALYSISOFTHE
INFORMATION ABOUT THE CUSTOMER
Figure 123
110/129
9018
- I
Figure 124 Figure 125
111/129
02
ANALYZING AN UNDERLYING ARCHITECTURE OF THE E
COMMERCE COMPONENT
if
04
COMPARING THE UNDERLYING ARCHITECTURE OF THE E
COMMERCE COMPONENT WITH AN ARCHITECTURE OF THE
FRAMEWORK OF THE ENTERPRISE
06
DETERMINING A COMPATIBILITY OF THE &COMMERCE
COMPONENT WITH THE FRAMEWORK OF THE ENTERPRISE
08
INTEGRATING THE E-COMMERCE COMPONENT WITH THE
ARCHITECTURE OF THE FRAMEWORK OF THE ENTERPRISE
10
INTEGRATING THE E-COMMERCE COMPONENT WITH
ENTERPRISE CAPABILITIES OF THE FRAMEWORK OF THE
ENTERPRISE
12
DETERMINING WHETHER THE E-COMMERCE COMPONENT
REQUIRES AN ADDITIONAL CAPABILITY, WHEREIN THE
ADDITIONAL CAPABILITY IS ADDED AS AN ENTERPRISE

CAPABILITY IF THE ADDITIONAL CAPABILITY IS REQUIRED

Figure 126

Bandwidth Market

Bandwidth Purchases Net Settlements

12700

Pre-Sold Bandwidth E

* Pre-Sold Bandwidth

Clearing

Sales contracts

passed to clearinc I

and settlements

12702 functions.

Open Market Bandwidth Open Market Bandwidth

Sales Clearing

12704

CL U)

CD W EL

co

0

Contract IN

correlate bandwidth

sales (with rating

info) to net

settlements

Usage N00833ing clearing function.

Figure 127

ALLOCATING BANDWIDTH ON A NETWORK AMONG A PLURALITY 12800
OF USERS

IDENTIFYING AN AMOUNT OF UNUSED BANDWIDTH OF A FIRST
USER
12804

RECEIVING A REQUEST FOR BANDWIDTH ON THE NETWORK
FROM A SECOND USER

REALLOCATING THE UNUSED BANDWIDTH OF THE FIRST USER "@@,12806
TO THE SECOND USER

Figure 128

MONITORING BANDWIDTH USE OF THE FIRST USER FOR 12900

DETERMININGANAMOUNTOFBANDWIDTHUSEDBYTHEFIRST
USER

COMPARING THE AMOUNT OF BANDWIDTH USED BY THE FIRST 12902
USERTOTHETOTALAMOUNTOFBANDWIDTHTHEFIRSTUSER
HAS BEEN ALLOCATED

)r

DETERMINING THE AMOUNT OF UNUSED BANDWIDTH BY 12904
SUBTRACTING THE AMOUNT OF BANDWIDTH USED BY THE FIRST
USER FROM THE TOTAL AMOUNT OF BANDWIDTH ALLOCATED
TO THE FIRST USER
12906

NOTIFYING THE FIRST USER OF THE AMOUNT OF UNUSED
BANDWIDTH
12908

SENDING A REQUEST ASKING WHETHER THE FIRST USER Figure 129

SENDING THE FIRST USER A REQUEST ASKING WHETHER THE
.,,@@13000

FIRST USER HAS ANY UNUSED BANDWIDTH THAT THE FIRST
USER WOULD LIKE TO TRADE OR SELL

RECEIVING A RESPONSE FROM THE FIRST USER INDICATING AN
AMOUNT OF UNUSED BANDWIDTH THAT THE FIRST USER

,@13002 VERIFYING THE AVAILABILITY OF THE AMOUNT OF UNUSED 13004
BANDWIDTH THAT THE FIRST USER WOULD LIKE TO SELL OR
TRADE

Figure 130
116/129
RECEIVING NOTIFICATION OF AN AGREEMENT TO SELL UNUSED 1 31 00
BANDWIDTH FOR AN AMOUNT OF MONEY
13102
RECEIVING INFORMATION CONCERNING THE MANNER OF
PAYMENT
13104
VERIFYING THE TRANSFER OF THE AMOUNT OF MONEY
1 3106
REALLOCATING THE UNUSED BANDWIDTH OF THE FIRST USER
TO THE SECOND USER
Figure 131
117/129
ALLOCATING BANDWIDTH ON A NETWORK AMONG A PLURALITY 13200
OF USERS
IDENTIFYING AN AMOUNT OF UNUSED BANDWIDTH OF A FIRST 1 1202
USER
RECEIVING A REQUEST FOR BANDWIDTH ON THE NETWORK 1 3204
FROM A SECOND USER
ALLOWING A NEGOTIATION BETWEEN THE FIRST AND SECOND 13206
USERS FOR DETERMINING TRANSACTION TERMS FOR
REALLOCATION OF THE UNUSED BANDWIDTH FROM THE FIRST
USER TO THE SECOND USER
SENDING CONTRACT INFORMATION RELATING TO THE 13208
TRANSACTION TERMS TO THE FIRST AND SECOND USERS
AFTER ACCEPTANCE OF THE TRANSACTION TERMS BY THE
FIRST AND SECOND USERS
Figure 132
118/129
Bandwidth Contract Flow
13302@@ 13308--@
Bandwidth Market Clearing and Settlements
Step #9: CNBC correlates EDRs with contract and
Stop #41: Bandwidth purchase rates connection based on contract
information. completes and transaction information The CINIBC then
performs a clearing and settlements (including pricing, QoG, etc.)
recorded. Step #5: function netting out the transfer of funds between
Contract
different DVNS.
information
P> (including Contract
ID) forwarded to
clearing function
Step #11: Step #3:
DVNS , DVNS,
Posts (offe Step #5: requests (bid)
e.c. Contract and
bandwidth information purchases
on market (including bandwidth Step #8: DVNSb forwards Event Data
Record (EDR) to CNBC with
Contract ID) for CPEb connection usage information and
forwarded to connection Contract ID.
all DVNS
involved in
tranapaction.
Step #7: CPE , forwards Raw Usage
Data (RUD) to DVNS.
O"
Step #6: Contract information (including Contract ID)
forwarded to CPE.. N
DVNS. DYNSb Step #2: CPEb requests bandwidth for connection MO
3300 --'@@3306 13304-'@
Figure 133
1 19/129

RECEIVING TERMS REGARDING A REALLOCATION OF
BANDWIDTH FROM A SELLER TO A BUYER
W
DETERMINING AN AMOUNT OF MONEY THE BUYER OWES THE 13402
SELLER FOR THE REALLOCATED BANDWIDTH BASED ON THE
TERMS REGARDING THE REALLOCATION OF BANDWIDTH
13404
NOTIFYING THE BUYER OF THE AMOUNT OF MONEY THE BUYER
OWES THE SELLER

Figure 134

120/129·

@ 1351 13512
OTHER MARKET
MAKERS
TRADER
T1 T2
1350
3504 3514
INSIDER MARKET
CUSTOMER BANDWIDTH
ACCOUNTS CPU 13 8 MARKET
PROCESSOR
REPORTABL
EXECUTIONS
INSTINET '@@3522 @13520
TH 3526 BRANCH ORDER -,-1 3524
FINANCIAL ENTRY CLERK/
HOUSE A.E.

Figure 135

121/129

T
ER DATA 3602
13606
13604
No
es
13606
No ERI
A E ?
13612
13614
13610 es No
ARK
13616 0 (BU Yes
No Yes
S=
13622 Y)
13618
< R
No
BSTB(BWT BW
Yes
13620
No No
W Z(BWT
Yes
13624
13626 13628
PRINT ALERT
RSZ(BWT
MESSAGE
13632
LPOS(B
POS(B

Figure 136

TO EXECUTE
ROUTINE
1221129
FROM ORDER
QUALIFICATION (FIGURE 137)
13700
No
v 13706 13702 BSZ(BWTH)
SSZ(BVVTH)=SSZ(BWTH)
-NOSH -NOSH
IF

@ 13708 13704
POS(BWTH)=POS(BWTH)
-NOSH -NOSH
13710
OUTPUT MESSAGES
IF 137137
TORE
13714
UPDATE PR(BVV@TH)
AVCST(BWTH)
13716
Figure 137
123/129
No
s
1380
3804
Ilr
s PR(BWTH)=PR(BWTH)
1380a-,,,@ +(LPOS(BWTH)*
(BSTA(BWTH)-AVCST(BWTH)))
No
(BUY) es
13810 13806
AVCST(BWTH)=(NOSH* AVCST(BWTH)=BSTA(BWTH)
BSTB(BWTH)+AVCST(BWTH)
*LPOS(BWTH))/POS(BWTH)
13812-,N,
PR(BWTH)=PR(BWTH)
+(NOSH*(BSTA(BWTH)
-AVCST(BWTH)))
Figure 138
124/129
S(B No
<0? 13908
Yes
PR(BWTH)=PR(BWTH)
+(LPOS(BWTH)*
139 (BSTB(BWTH)-AVCST(BWTH)))
YE
(BUY) 13910
13904-
I F. (SELL) No IF
AVC T(BWTH)=(NOSH*
BSTA(BWTH)+AVCST(BWTH) AVCST(BWTH)-BSTB(BWTH)
*LPOS(BWTH))/POS(BWTH)
1390
PR(BWTH)=PR(BWTH)
+(NOSH*(BSTB(BWTH)
-AVCST(BWTH)))
Figure 139
125/129
I F 14002

F AUTO=NON-AU
14004
CHAN
Yes
1400
14012
UPDATE BSTB(BWTH) AUTO AUTO
BSTA(BWTH)
1400&-@@
INTERACTIVE TERMINAL
COMMUNICATION 14014
1401
0--@@ v
REPROCE S FILE FOR
ANY NEWLY
EXECUTABLE ORDERS
Figure 140
126/129
14102 14104
14120 14132
MER 24 14126
@@coupo
1412
4130
14136
A'
14110
14128 9 LOCKBOX
14134
HECK
14106 14134
BANK C G) BANK B
@16@ZIN @
@B's ACCOUN
ACCOUNT
CHECK
14112 14114 $$O'[@@14134 14118 14116
Figure 141
127/129
14200
14104
14102
14209 1 421 0
NSUMER VOIDED CHE K r B
C BILLER
I INFORMATION
14202
BILL PAY: SERVICE
208 ALITH BUREAU 1420
DATE
AMOUNT 6
BILLER
SERVICE 14212
6 DATABASE T
142 CHECK a L
14128 14204 14220 CHECK 14134 14214 CHE(
BANK S
CLEARING 16
BANK 14218 S-SACCOUNT 8
STATEMENT 14214
14106 14214 14108
-)L
BANK C BANK B
CHECK
JNT r CLEARING

```
14134
14112 14114 14118 1
Figure 142
14300
14102 14104
VOIDED CHE 14132 lz
ONSUMER 4306
c CLIS ER
DATABAS
ADVICE OF IMPENDING DEBIT
PRE-AUTF-7 14
430 143107
14128 431
14108 B
14310
141 6 14310
BANK C
(RFDI) 14312
s ACH
1 2
Figure 143
```
?

Help   Logout   Interrupt

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L8 and (entit$ with instance)	2

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Set Name	Query	Hit Count	Set Name
side by side			**result set**

DB=USPT; THES=ASSIGNEE; PLUR=YES; OP=OR

Set Name	Query	Hit Count	Set Name
L13	L8 and (entit$ with instance)	2	L13
L12	L8 and ((relation or relativ$) with (table or instanc$))	1	L12
L11	L8 and ((entit$ or account$) with instance)	2	L11
L10	L8 and ((pric$ or cost$ or charg$ or fee) with instanc$)	1	L10
L9	L8 and (table with instanc$)	1	L9
L8	5559313.pn. or 5682482.pn. or 5636117.pn. or 5630127.pn.	4	L8

DB=EPAB,DWPI; THES=ASSIGNEE; PLUR=YES; OP=OR

L7	(boardman adj s$) and (decision with prices)	1	L7
L6	(clarke adj s$) and (billing with event)	1	L6
L5	L4 and (bill$ and price$)	1	L5
L4	hoffman adj s$	77	L4
L3	L2	0	L3

DB=USPT; THES=ASSIGNEE; PLUR=YES; OP=OR

L2	(bill$ adj system) with (pricing adj rule) with customer with service	0	L2
L1	(bill$ adj system) with (pricing adj rulle) with customer with service	0	L1

END OF SEARCH HISTORY

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L5: Entry 1 of 1   File: USPT   Oct 28, 1997

DOCUMENT-IDENTIFIER: US 5682482 A
TITLE: Facilitating the supplying of services in a network

US PATENT NO. (1):
5682482

Brief Summary Text (4):
Within the communications industry what is commonly termed "operational support
systems" ("OSS") are the systems that enable the provision of service to customers,
the billing for such service, and the support of customers. Cable television and
telephone systems are two examples of communication networks. Each offers services
to users of the network. Such services currently include the delivery of video and
voice signals, digital data delivery, and voice messaging and retrieval services.
The processes required to deploy and deliver these services, and others, are
numerous and in some cases very involved.

WEST

End of Result Set

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L7: Entry 1 of 1   File: USPT   Oct 28, 1997

DOCUMENT-IDENTIFIER: US 5682482 A
TITLE: Facilitating the supplying of services in a network

US PATENT NO. (1):
5682482

Abstract Text (1):
A network architecture is provided for enhanced support of network services. The architecture includes an operations gateway defined by a number of agents that take responsibility for accomplishing support system related functions including financial transaction functions. Messages are conveyed to the agents that have informational elements containing data or other information useful in accomplishing the necessary functions. Preferably, the network is defined to comprise one or more layers including a service layer, a service instance layer, a connection layer and a connection instance layer. Each layer has associated with it one or more management, fulfillment, charging and booking agents. The operations gateway enables service providers to rapidly introduce new services while optimizing the interchangeability of system components or equipment that are useful in supporting the network services.

Brief Summary Text (4):
Within the communications industry what is commonly termed "operational support systems" ("OSS") are the systems that enable the provision of service to customers, the billing for such service, and the support of customers. Cable television and telephone systems are two examples of communication networks. Each offers services to users of the network. Such services currently include the delivery of video and voice signals, digital data delivery, and voice messaging and retrieval services. The processes required to deploy and deliver these services, and others, are numerous and in some cases very involved.

Brief Summary Text (8):
When multiple companies are involved in the delivery of a service, close coordination must occur to ensure that these processes are properly executed. The problem becomes more apparent and pronounced when services span multiple enterprises, such as a billing company serving a cable television company. In this case, in order to support the necessary processes, a high level of coordination and cooperation is required between the two companies. The companies must exchange data to bill for the service, to control the network and to provide support to the customers. Such coordination and cooperation is required because there are no well accepted or standard interfaces between different companies' systems. This coordination is time consuming and expensive so the enterprises involved are loathe to alter the service offerings and limits the competition around such relationships. This also further limits the offering of new services.

Brief Summary Text (9):
Communication companies offer many types of service applications to their customers. Because of the application specific nature of current OSS's, companies which offer multiple services have multiple operations systems that are not integrated with one another. This causes personnel to have to be trained on a number of systems and the cost of supporting the service offerings is substantially increased because of the need for such multiple OSS's. Furthermore, often times data that is necessary for

the support of one application is also necessary for another. Thus, such data is duplicated because of the lack of integration and interoperability among such systems. Such duplication is wasteful and expensive and causes operational problems when the duplicative data becomes inconsistent.

Brief Summary Text (13):
The invention accomplishes this by: establishing a model that represents all networks, including communications networks, and services provided by such networks; separating the operations functions in the support systems necessary for the support of the operations of the network from the physical components that actually deliver the service; implementing a system of standard interfaces for purposes of network management, billing functions, and service fulfillment; allowing for support systems that are technology and service application independent; permitting interoperability between systems that support different applications and interoperability between components of systems supplied by different vendors; standardizing the data and data formats necessary for initiating and implementing operations functions thereby reducing duplicate information necessary for the operations support systems; reducing the number of systems that operations support personnel need to be trained upon; permitting coordination and cooperation among service and network providers for delivery of new services and new technology.

Brief Summary Text (15):
In performing functions, management agents associated with one or more of the service, service instance, connection and connection instance layers receive messages having informational elements that contain data or other information necessary for the agents to take responsibility for accomplishing the management related functions. Among other responsibilities, the management agents are responsible for invoking appropriate fulfillment agents and charging agents. The fulfillment agents are responsible for fulfilling the desired function or functions associated with a particular layer, such as fulfilling the particular service instance and providing the necessary network connection or connections for delivery of the service instance. In one application, the service instance relates to the delivery of a specific movie pursuant to a video on demand service. The charging agents take responsibility for determining an amount, such as an amount related to the cost of providing network connections and/or the delivery of the particular service instance. The charging agents also are responsible for invoking appropriate booking agents, which take responsibility for debiting and/or crediting proper accounts using the amount.

Drawing Description Text (6):
FIG. 5 schematically illustrates information and/or data received in messages by agents associated with the four layers of the network; and

Detailed Description Text (2):
In accordance with a preferred embodiment of the present invention, as illustrated in FIG. 1, a network 10 is provided that includes a number of support systems 14. The network 10 is used in providing a variety of services and can be defined as including, for example, such networks as a personal communications network 18, a full service network 22, a telephone network 26 and/or other present/future communication networks 30. The personal communications network 18 provides desired communications among a plurality of users linked together by the network. The full service network 22 provides a plurality of available services to users on the network. The telephone network 26 provides voice communication or other data services to users of the network. The services are delivered using the network 10 by a multitude of service providers to one or more users or customers that request any such service. Typically, these networks 18-30 comprise a number of hardware components or equipment, software, operations support systems and other systems that are required for proper operation of the network (collectively and individually referred to as "network systems"). Such network systems are utilized in providing presently defined services and at least some of which are expected to be useful in providing future and not yet defined services over the network 10.

Detailed Description Text (4):
Essential to the present invention is an operations gateway 50 that interfaces with the networks 18-30 and the support systems 14. The operations gateway 50 responds to

a predetermined protocol in taking responsibility for functions that need to be accomplished in order to support the providing of services by the network 10. The operations gateway 50 receives information and/or data from the network 10 that enable it to respond in a manner that results in the accomplishment of the desired functions. These functions include, for example, managing relationships between service providers and service users, fulfilling service instances, determining an amount to be billed for a specific service instance and crediting and/or debiting an account related to a particular service instance. The accomplishment of these functions is achieved primarily by means of the financial transaction system 32 and other agent and network systems. It should be appreciated, however, that these are only representative functions for the system 32 and further and/or other appropriate functions can be accomplished by the system 32, as well as further and/or other functions appropriate to systems 36-44.

Detailed Description Text (6):
With respect to achieving the communication that is required for the agent interface 58 and its associated agents 54 in conjunction with taking on the responsibility for accomplishing the functions, messages are sent or inputted to the agent interface 58 by message senders. Each message includes common information. In particular, each message can be defined as including a number of informational elements that include data and/or other information useful in implementing the functions. In the context of financial transaction related functions, such informational elements may include service request information, service instance request information and connection request information that relate to a service to be supplied by a provider to a user and how a particular service instance is to be charged. Other informational elements may contain booking data describing a particular booking to be used for a user or a provider, fulfillment agent data describing a fulfillment agent to be used for fulfilling a request, charging agent data describing a charging agent to be used in charging an amount associated with a request, description data describing a particular request and/or accounting rules used in determining an amount to charge. Informational elements that are more general or more common among a plurality of messages include: an identification of a user of a particular service, an identification of a provider of the particular service, a type of information that is related to the particular service, such as a voice communication service or a video on demand service, and a session.sub.-- id that describes the particular service, such as the providing of an identified movie.

Detailed Description Text (45):
With the foregoing nomenclatures and meanings in place, reference is made to FIG. 3A to describe a general application utilizing appropriate agents 54 of the agent interface 58 in conjunction with providing a service to a user. FIG. 3A identifies certain agents 54 with communication paths indicated by lines that represent paths of messages containing data or other information required to provide the service. The agent systems 66 associated with these agents are not specifically illustrated; however, it should be understood that the agents 54 are not responsible for accomplishing the functions while the agent systems 66 associated therewith accomplish the functions, but to simplify the illustration, only the agents 54 themselves are illustrated. It should be appreciated that necessary agent systems 66 are linked to or "in back of" the agents 54 in order to accomplish the identified functions.

Detailed Description Text (46):
With respect to the relevant paths for providing the service, FIG. 3A illustrates a service layer 100 with a number of agents 54 associated therewith including: a management agent 104 for the service layer (MA.sub.s); a fulfillment agent 108 for the service layer (FA.sub.s); and a charging agent 112 for the service layer (CA.sub.s). FIG. 3A also identifies message paths for sending requests to agents, namely: path 1 to MA.sub.s 104 from a user, which request may emanate from a network system 70, for example. In connection with describing what occurs, a message connotation is provided associated with path 1, namely: 1) service.sub.-- req (session.sub.-- id, user, provider, service.sub.-- request). In accordance with this message representation, the term "service.sub.-- req" represents a message label and the terms within the parentheses identify the informational elements that contain data or other information. In particular, a request is made from a user for a service request. The "user" informational element identifies the user of the

service. The "provider" identifies a provider and is optional information. The "session.sub.-- id" describes the service being requested by the user. The MA.sub.s 104 manages the relationship between the service user and the service provider. It takes responsibility for invoking the fulfillment agent (FA.sub.s) 108 and the charging agent (CA.sub.s) 112 in the service layer 100. With regard to invoking the charging agent in the service layer 100, the MA.sub.s 104 takes responsibility for sending a message along path 1.1 to the charging agent 112, with the message being defined as: 1.1) charging.sub.-- transaction.sub.-- req (session.sub.-- id, user, service.sub.-- request). This message label indicates that a financial transaction is being requested for the service over the network 10. This charging agent CA.sub.s 112 is responsible for determining the parameters associated with the particular service instance. The particular service to be provided is described in the session.sub.-- id and the identity of the user for the service is also provided in the message. The CA.sub.s 112 takes responsibility for specifying how often an accounting must be made for the fulfillment taking place in the service layer 100. This is done in accordance with message path 1.2, namely: 1.2) charging.sub.-- transaction.sub.-- ack (session.sub.-- id, service.sub.-- request). In this message, the service.sub.-- request includes service.sub.-- request.sub.-- accounting.sub.-- rules, which specifies how often an accounting for this fulfillment must be made, e.g., upon completion, periodically (time or service unit based) and resource units required for rating by this CA.sub.s 112. The informational element service.sub.-- request also includes a service.sub.-- request.sub.-- service.sub.-- ca that specifies the particular charging agent to be used for the service instance requested by the user. The MA.sub.s 104 also selects the particular fulfillment agent 108, typically based on a service profile generated as a function of at least the identity of the user, the particular service request and, optionally, the identity of a provider. With respect to path 2, the message can be characterized as: 2) service-req (session.sub.-- id, service.sub.-- user, service.sub.-- request). This message label indicates that a service request is sent to the fulfillment agent 108 denoted by service.sub.-- fa informational element of the service.sub.-- request, by the management agent 104 for the identified service.sub.-- user, with the particular service session.sub.-- id being described. Similarly, the particular charging agent 112 associated with the service.sub.-- request is denoted using the service.sub.-- ca informational element. In the case of FIG. 3A, the FA.sub.s 108 represents and is responsible for handling the service instance that is to be used and which is associated with the general category of the service, such as video on demand.

Detailed Description Text (47):
Referring to FIG. 3B, path 3 indicates the next step that is conducted for which the fulfillment agent 108 takes responsibility, namely: 3) service.sub.-- instance.sub.-- req (session.sub.-- id, service.sub.-- user, service.sub.-- instance.sub.-- request). This message indicates that the FA.sub.s 108 has sent a message to the appropriate or selected management agent (MA.sub.si) 116 of the service instance layer 120. The service instance MA.sub.si 116 takes responsibility for managing the financial transaction and fulfillment of the particular service instance. In that regard, a message path 4 is provided, namely: 4) charging.sub.-- transaction.sub.-- req (session.sub.-- id, service.sub.-- user, service.sub.-- instance.sub.-- request). In accordance with this message, a financial transaction is initiated. The particular charging agent 124 is identified by a service.sub.-- instance.sub.-- ca informational element, which is part of the service.sub.-- instance.sub.-- request. In addition, part of the service.sub.-- instance.sub.-- request includes a service.sub.-- instance.sub.-- user.sub.-- booking informational element that identifies a booking agent to be used and also provides booking information, e.g., is a credit check required before this particular service instance delivery. As before, service.sub.-- user will identify the particular service user and the session.sub.-- id will describe this particular current session related to providing of this service instance. With regard to such a credit check, path 5 provides a message generated using the charging agent 124 to an appropriate or selected booking agent (BA.sub.si) 128 associated with the service instance layer 120. The message along this path is defined as: 5) check.sub.-- credit (session.sub.-- id, service.sub.-- user, service.sub.-- instance.sub.-- amount). In accordance with this message, the BA.sub.si 128 checks the user's credit using the information found in the service.sub.-- user informational element based on the <u>data</u> in the informational element service.sub.-- instance.sub.-- amount. The associated

or underlying agent system(s) 66 actually perform(s) the function(s) for checking credit. If satisfactory, the available credit is decremented in accordance with the data or amount set forth in the designated informational element. In accordance with path 6, the BA.sub.si 128 sends a message to CA.sub.si 124 acknowledging the credit check and which message is defined as: 6) check.sub.-- credit.sub.-- ack (session.sub.-- id). Next, the CA.sub.si 124 takes responsibility for charging for the fulfillment of the particular service instance, namely: 7) charging.sub.-- transaction.sub.-- ack (session.sub.-- id, service.sub.-- instance.sub.-- request). In accordance with this message, the service.sub.-- instance.sub.-- request informational element includes information and/or data associated with service.sub.-- instance.sub.-- accounting.sub.-- rules, which specify, for example, the rules or algorithm to financially account for the fulfillment accomplished in connection with the particular service instance. For example, the agent 124 takes responsibility for associating with one or more appropriate or selected agent systems 66 that periodically (time or service unit based) account for the service instance and take into account the resource units that might be required for any necessary charging function. In that regard, the resource units may be expressed in a general way so that the accounting rules need not be limited to a particular fulfillment agent.

Detailed Description Text (66):
With continued reference to FIG. 3F, the MA.sub.c 184 also takes responsibility for initiating a message from the connection layer 130 to the service instance layer 120 in light of the completion of the particular service instance. More specifically, the MA.sub.c 184 sends a message along path 17 to the fulfillment agent 132 (FA.sub.si). This message is defined as: 17) connection.sub.-- released (session.sub.-- id). Similarly, the MA.sub.c 192 initiates a message along path 17' to the FA.sub.si 132, which is defined as: 17') connection.sub.-- released (session.sub.-- id). The FA.sub.si 132 takes responsibility for handling the information related to the release of each of the two network connections for the current session that is identified in the respective messages. Additionally, the FA.sub.si 132 takes responsibility for reporting service instance resource usage for the current session to the MA.sub.si 116 in accordance with the message: 18) service.sub.-- released (session.sub.-- id, service.sub.-- instance.sub.-- resources). Next, a message along path 19 is provided: 19) charge.sub.-- transaction (session.sub.-- id, service.sub.-- instance.sub.-- resources). This message is sent to the CA.sub.si 124, which takes responsibility for charging appropriate accounts based on resource unit usage in the service instance layer 120 and based on predetermined rules or algorithms. The CA.sub.si 124 is also responsible for using agent systems to accomplish these functions including the determination of the amounts to be booked. In that regard, along path 20, a message is sent defined as: 20) debit (session.sub.-- id, service.sub.-- instance.sub.-- request.sub.-- user.sub.-- booking, amount), the BA.sub.si 128 takes responsibility for debiting the amount to the appropriate account based on the content of the informational elements in the message. Similarly, along path 21, the proper account is credited for the particular service instance in accordance with the following: 21) credit (session.sub.-- id, service.sub.-- instance.sub.-- request.sub.-- user.sub.-- booking, amount). The data and/or information associated with this message is used by the BA.sub.si 186 in crediting the appropriate provider account for the service instance that was just delivered.

Detailed Description Text (79):
Referring to FIG. 4B, the CA.sub.ci 244 is involved with a message being sent to each of two management agents in the connection instance layer, which messages are identified as: 11) charging.sub.-- transaction.sub.-- ack (session.sub.-- id, connection.sub.-- instance.sub.-- request) and 11') charging.sub.-- transaction.sub.-- ack (session.sub.-- id, connection.sub.-- instance.sub.-- request). Each of these acknowledging messages contain information or data that specifies how often an accounting for the fulfillment of this network connection.sub.-- instance must be made for the particular movie that is being transmitted, just as was done in the other layers. Such information or data related to the accounting is contained in the connection.sub.-- instance.sub.-- request.sub.-- accounting.sub.-- rules informational element which may include information that the accounting for this connection.sub.-- instance fulfillment is to made upon completion of the particular network connection.sub.-- instance or on a

periodic basis, based on time and/or service units. Suchinformation is also expected
to include the resource units for rating that are required by the CA.sub.ci 244.

Detailed Description Text (80):
In fulfilling the necessary network connection.sub.-- instances, the following
messages are identified: 12) connection.sub.-- req (session.sub.-- id,
connection.sub.-- user, connection.sub.-- instance.sub.-- request) and 12')
connection.sub.-- req (session.sub.-- id, connection.sub.-- user, connection.sub.--
instance.sub.-- request). These messages are sent to fulfillment agents in the
connection instance layer, namely, FA.sub.ci 248 and FA.sub.ci 252, respectively.
Each of these messages provides information and data to these fulfillment agents
248, 252 to enable them to ascertain that a network connection is being requested.
These agents take responsibility for accomplishing the particular network connection
functions that must be dynamically made in order to deliver the particular movie to
the user. In accordance with fulfilling these functions, an internal, proprietary
message is generated to connect the incoming channel from the server 228 through the
network 232 to a specific channel to the user. These message paths for the two
network connections of the present example are identified as 12.5 and 12.5'. As can
be appreciated, a substantial number of functions and communications must occur in
order to provide the necessary connections to the set top box 200 by the network
232.

Detailed Description Text (81):
With reference to FIG. 4C, the description of the example is continued with the
video on demand service having been completed. Specifically, along paths 12.6 and
12.6', messages that originate in the service instance layer involving the FA.sub.si
224 are received by connection layer management agents MA.sub.c 282 and MA.sub.c
284, respectively, and which are denoted as: 12.6) release.sub.-- connection
(session.sub.-- id) and 12.6') release.sub.-- connection (session.sub.-- id). Each
of these received messages provides information to the respective management agents
282, 284 that the current session being described is now finished and these two
agents must take responsibility for managing the release of the previously formed
connections. In doing so, the FA.sub.c 288 and the FA.sub.c 286 receive messages
initiated by the MA.sub.c 282 and the MA.sub.c 284 along paths 12.7 and 12.7',
namely: 12.7) release.sub.-- connection (session.sub.-- id) and 12.7')
release.sub.-- connection (session.sub.-- id). In accordance with these messages,
each of the MA.sub.c 282 and the MA.sub.c 284 takes responsibility for managing the
appropriate fulfillment agents which, in turn, assume responsibility for releasing
the first and second network connections made with the necessary communications or
other service-related networks because the delivery of the particular movie to the
user has been completed. In that regard, the FA.sub.c 288 initiates a message along
path 12.75 to the connection instance layer. That is, a message is received by the
MA.sub.ci 236. Similarly, the FA.sub.c 288 initiates a message along path 12.75' to
the MA.sub.ci 240 in the connection instance layer related to releasing the specific
network connections that were utilized in delivery of the particular movie. These
messages along paths 12.75 and 12.75' are defined as: 12.75) release.sub.--
connection.sub.-- instance (session.sub.-- id) and 12.75') release.sub.--
connection.sub.-- instance (session.sub.-- id). Each of these received messages
provides information to the respective management agents 236, 240 that the current
session being described is now finished and these two agents must take
responsibility for managing the release of the previously formed connection.sub.--
instances. In order to do so, the FA.sub.ci 248 and the FA.sub.ci 252 receive
messages initiated by the MA.sub.ci 236 and the MA.sub.ci 240 along paths 12.76 and
12.76', namely: 12.76) release.sub.-- connection.sub.-- instance (session.sub.-- id)
and 12.76') release.sub.-- connection.sub.-- instance (session.sub.-- id). In
accordance with these messages, each of the MA.sub.ci 236 and the MA.sub.ci 240
takes responsibility for managing the appropriate fulfillment agents which, in turn,
assume responsibility for releasing the dynamically generated network
connection.sub.-- instances, since the delivery of the particular movie to the user
has been completed. The FA.sub.ci 248 and the FA.sub.ci 252 also take responsibility
for generating proprietary messages that disconnect this previously provided
communication paths through the network 232 along paths 12.8 and 12.8'. Referring
next to FIG. 4D, messages are initiated by the FA.sub.ci 248 and the FA.sub.ci 252
that are received by the MA.sub.ci 236 and the MA.sub.ci 240 along paths 13 and 13'
which are defined as: 13) connection.sub.-- instance.sub.-- released (session.sub.--

id, connection.sub.-- instance.sub.-- resources) and 13') connection.sub.-- instance.sub.-- released (session.sub.-- id, connection.sub.-- instance.sub.-- resources). In accordance with these messages, information is provided that the network connection.sub.-- instances are released and resource usage is reported to these management agents, who will take responsibility for managing the charging associated with the network connection.sub.-- instances that delivered the selected movie. In that regard, the CA.sub.ci 244 receives messages along paths 14 and 14' that are identified as: 14) charge.sub.-- transaction (session.sub.-- id, connection.sub.-- instance.sub.-- resources) and 14') charge.sub.-- transaction (session.sub.-- id, connection.sub.-- instance.sub.-- resources). In accordance with these messages, the charging agent 244 takes responsibility for determining and charging the amount for these network connection.sub.-- instances associated with the particular service instance. As part of this responsibility, the CA.sub.ci 244 is responsible for sending messages that are received by one or more booking agents. In particular, a booking agent (BA.sub.ci) 260 is responsible for functions related to the debiting of the user's account. In the present example, this involves a credit card whereby the appropriate account in the credit card company 264 is debited for these network connection.sub.-- instances. Similarly, the booking agent (BA.sub.ci) 268 receives a message that results in the BA.sub.ci 268 taking responsibility for crediting the accounts receivable 272 of the connection.sub.-- instance (network) owner, based on data and/or other information for which the CA.sub.ci 244 takes responsibility. These messages are identified as follows:

Detailed Description Text (86):
As with the previous description given in connection with the general example of FIGS. 3A-3E, messages are sent to agents, along the paths identified in FIG. 4D, related to accomplishing the necessary functions and to generating further messages and sending them to agents in the connection, service instance and service layers directed to the release of the network connections, the release of the service instance and the release of the service, together with information and data that enables the connection (communication or other service related network connection that was required to deliver the movie), service instance (delivery of the movie) and service (video on demand) to be charged and booked using appropriate agents and agent systems, including an accounts receivable 276 associated with the provider or server 228 for the service, service instant and "static" connections related to the delivery of the movie. These messages are defined as:

Detailed Description Text (104):
With reference to FIG. 5, a further illustration is provided that summarizes certain information that is required by the agents of the four network layers, as applied to billing functions. In that regard, for each of the four layers, an information model is presented that identifies information/data required by these different agents. With respect to the service instance layer, the management agent (MA) receives information and/or data directed to the service instance relationship including the identity of the service instance user, the type of service, the provider of the service instance and a current description of the particular service instance, such as the movie selected using the video on demand service. The fulfillment agent (FA) of the service instance layer requires information related to the delivery of the service including the current session that describes the service instance to be provided, such as the particular movie to be delivered. The information/data required by this agent also includes the algorithm or rules necessary to accomplish the fulfillment. Additional information to the fulfillment agent in the service instance layer includes the identities of the user and the provider for the particular application instance. The charging agent (CA) of the service instance layer receives financial transaction data and information including the current session describing the service instance and a rating algorithm for use in charging for the service instance. Booking agents (BA) receive information related to debiting and crediting appropriate accounts including a description of the current session.

CLAIMS:

1. A method involving the supplying of services, comprising:

defining for analysis a network including four layers, including:

a service layer that defines an information model for management of a number of services available from a plurality of providers to a plurality of users;

a service instance layer that defines an information model for management of a particular service to a user and requests network connections to provide said particular service;

a connection layer that defines an information model for management of physical and logical devices and their interconnections within said network; and

a connection instance layer that defines an information model for management of connections in said network that are required to provide available services;

identifying functions to be accomplished using agent systems associated with said layers, said functions including managing a relationship between a user and a provider that is appropriate for one or more of said layers, fulfilling a capability to be provided to a user that is appropriate for one or more of said layers, determining an amount to be billed for a specific use of a capability that is appropriate for one or more of said layers and crediting or debiting an account that is appropriate for one or more of said layers;

associating with said functions a plurality of mechanized agents including a first agent having a predetermined function that is different from functions of each of said other of plurality of agents;

analyzing using said layers and said agents, in connection with making decisions related to arrangement and implementation of said agent systems, said hardware, said software and said support systems, said analyzing step further including:

allowing for said support systems to be technology and service application independent;

permitting interoperability between at least two of said hardware, software and support systems that are involved with supporting different service applications;

permitting interoperability between said hardware and said software supplied by different vendors;

standardizing data and data formats necessary for initiating and implementing said functions;

reducing a number of said hardware, said software and said support systems that operation support personnel need to be trained upon; and

permitting coordination and cooperation among service and network providers for delivery of new services and new technology; and

implementing the supplying of a plurality of services using at least one of said agent systems, said hardware, said software and said support systems, said implementing step including formulating messages that include informational elements related to: a service request, a service instance request, a connection request and a connection instance request and in which each one of said requests includes at least one of the following: user booking data describing a booking to be used for a user; provider booking data describing a booking to be used for a provider; fulfillment agent data describing a fulfillment agent to be used for fulfilling said request; charging agent data describing a charging agent used in charging an amount associated with said request; description data describing said request; and accounting rules used in charging related to said request.

2. A method for facilitating the supplying of services using a network in which there are a number of service providers and in which there are a plurality of mechanized agents to take responsibility for the accomplishment of desired functions, a plurality of mechanized agent systems for accomplishing the functions initiated by the mechanized agents and with a plurality of messages being received

by the mechanized agents in connection with providing the services, the method comprising:

initiating a request to a management agent using a control channel for a first service instance to be provided to a first user by a first service provider, said management agent being responsible for managing the relationship between the first user and the first service provider involving the delivery of said first service instance;

invoking a fulfillment agent a first time using said management agent and in which said fulfillment agent receives a first message that includes informational elements related to an identity of said first user and a description of the first service instance, said fulfillment agent being responsible for operations to be performed by one or more agent systems including at least a first function related to delivery of said first service instance to the first user;

invoking a charging agent a first time using said management agent and in which said charging agent takes responsibility for charging for said first service instance and in which said charging agent receives a second message that includes informational elements related to the identity of the first user and a description of said first service instance, and in which said charging agent delays complete charging for said first service instance until after said first service instance is terminated;

requesting a first component service instance using said fulfillment agent, and in which said first component service instance is involved with a second function, different from said first function, and with both of said first and second functions being needed to provide said first service instance to the first user;

providing said first service instance to the first user over a first service delivery channel in said network, different from said control channel, after said requesting of said first component service instance and after said invoking of said fulfillment agent and said charging agent said first time;

generating a termination request for terminating said first service instance;

invoking said fulfillment agent a second time after said generating step in connection with the termination of said first service instance and in which said fulfillment agent receives a third message that includes informational elements related to the identity of the first user and a description of said first service instance and in which said fulfillment agent takes responsibility for operations related to termination of said providing of said first service instance;

invoking said charging agent a second time after said step of generating said termination request for terminating said first service instance using one of said management agent and said fulfillment agent and in which said charging agent receives a fourth message that includes informational elements related to data based on the amount of use by the first user of said first service instance and charging parameters for use in determining charges for said first service instance including said providing thereof;

discontinuing use of said first service delivery channel in connection with said first service instance;

initiating a request to said management agent for a second service instance to be provided to a second user by the first service provider;

invoking said fulfillment agent a third time using said management agent and in which said fulfillment agent receives a fifth message that includes informational elements related to the identity of the second user and a description of said second service instance, said fulfillment agent being responsible for operations to be performed by one of more agent systems, including at least a first function, related to delivery of said second service instance to the second user;

invoking said charging agent a third time using said management agent and in which said charging agent receives a sixth message that includes informational elements

related to the identity of the second user and a description of said second service instance;

requesting a second component service instance, different from said first component service instance, using said fulfillment agent and in which said second component service instance is involved with providing a second function, different from said first function, and with both of said first and second functions being needed to provide said second service instance to the second user by the first provider;

providing said second service instance to the second user after said requesting of said second component service instance and after said invoking of said fulfillment agent and said charging agent said third time;

generating a termination request for terminating said second service instance;

invoking said fulfillment agent a fourth time after said generating step in connection with termination of said second service instance and in which said fulfillment agent receives a seventh message that includes informational elements related to the identity of the second user and a description of the second service instance and in which said fulfillment agent takes responsibility for operations related to termination of said providing of said second service instance;

invoking said charging agent a fourth time after said step of generating said termination request for terminating said second service instance using one of said management agent and said fulfillment agent and in which said charging agent receives a eighth message that includes informational elements related to the identity of the second user, data based on the amount of use by the second user of said second service instance and charging parameters for use in determining charges for delivery of said second service instance and in which said charging agent is responsible for determining charges for said second service instance including said providing thereof;

wherein, for each of said first and second service instances, charging for said first and second service instances is pre-established so that the first and second users are not involved in negotiating charging terms with the first service provider in order to conduct said providing of said first and second service instances;

wherein said charging agent, together with its operational relationship involving said management agent and said fulfillment agent, are known and pre-established for charging for said first and second service instances before said first and second services instances are initiated by the first and second users, respectively;

wherein each of said management agent, said fulfillment agent and said charging agent is a mechanized agent and each communicates with a different one of said plurality of mechanized agent systems, said plurality including a first agent system communicating with said charging agent and in which said first agent system is modular wherein, when said first agent system is replaced by a second agent system, said first charging agent communicates the same informational elements to said second agent system as said first charging agent communicated with said first agent system;

wherein each of said management agent, said fulfillment agent and said charging agent is responsible for a predetermined function that is different from each predetermined function of each of the other of said management agent, said fulfillment agent and said charging agent; and

wherein each of said informational elements of each of said one through eighth messages is provided in a predetermined order and format acceptable to said agents and in which each of said management, fulfillment and charging agents initiates a predetermined response depending on content of said messages.

7. A method, as claimed in claim 6 wherein:

said ninth message includes informational elements related to booking data describing a booking to be used for the first service user and first service

provider booking data describing a booking to be used for the first service provider.

20. An architecture for facilitating the providing of services using a network, comprising:

a network for providing available services to users, said network including support systems for supporting the providing of the services, said support systems having a plurality of agent systems and said network having a plurality of network systems including hardware and software required for proper network operation, said network further including a control channel for carrying a request related to a service instance to be provided to a user and a service providing channel, different from said control channel, through which a service instance is to be delivered; and

an operations gateway in operative communication with said network including said network systems and said agent systems, said operations gateway including a plurality of agents, said agents constituting an interface that takes responsibility for the accomplishment of one or more functions using said agent systems, said agents receiving messages from said agent systems, said network systems and others of said plurality of said agents, each of said messages including informational elements useful in providing the services;

wherein said plurality of agents includes a management agent, a fulfillment agent and a charging agent, said management agent being responsible for managing the relationship between service users and service providers including a first user, a second user and a first service provider, the fulfillment agent being responsible for operations to be performed by one or more agent systems including at least a first function related to delivery of said first service instance to the first user and a first function related to delivery of said second service instance, said charging agent taking responsibility for said first service instance and said second service instance and in which said charging agent delays complete charging for each of said first and second service instances until after each of said first and second service instances, respectively, is terminated;

first means for providing a first component service instance in which said first component service instance involves using said fulfillment agent and said first component service instance has a second function in connection with said first service instance, which is different from said first function, and with both of said first and second functions being needed to provide said first service instance to the first user;

second means for providing a second component service instance in which said second component service instance involves using said fulfillment agent and said second component service instance has a second function in connection with said second service instance, which is different from said first function, and with both of said first and second functions being needed to provide said second service instance to the second user;

wherein said plurality of messages include:

a first message received by said fulfillment agent that includes informational elements related to an identity of the first user and a description of said first service instance and in which said first message is received using said management agent before completion of said first service instance;

a second message received by said charging agent that includes informational elements related to the identity of the first user and a description of said first service instance and in which said second message is received before completion of said first service instance;

a third message received by said fulfillment agent that includes informational elements related to the identity of the first user and a description of said first service instance and in which said third message is received in connection with termination of said first service instance;

a fourth message received by said charging agent that includes informational elements related to data based on the amount of use by the first user of said first service instance and charging parameters for use in determining charges for said first service instance including providing thereof and in which said fourth message is received in connection with termination of said first service instance;

a fifth message received by said fulfillment agent that includes informational elements related to an identity of the second user and a description of said second service instance and in which said fifth message is received using said management agent before completion of said second service instance;

a sixth message received by said charging agent that includes informational elements related to the identity of the second user and a description of said second service instance and in which said sixth message is received before completion of said second service instance;

a seventh message received by said fulfillment agent that includes informational elements related to the identity of the second user and a description of said second service instance and in which said seventh message is received in connection with termination of said second service instance; and

an eighth message received by said charging agent that includes informational elements related to data base based on use by the second user of said second service instance and charging parameters for use in determining charges for said second service instance and in which said seventh message is received in connection with termination of said second service instance;

wherein said charging agent, together with its operational relationship with said management agent and said fulfillment agent, are known and pre-established for charging for said first and second service instances before said first and second service instances are initiated by the first and second users, respectively;

wherein each of said management agent, said fulfillment agent and said charging agent is a mechanized agent and each communicates with a different one of said plurality of mechanized agent systems, said plurality including a first agent system communicating with said charging agent and in which said first agent system is modular wherein, when said first agent system is replaced by a second agent system, said charging agent communicates the same informational elements to said second agent system as said charging agent communicated with said first agent system;

wherein each of said management agent, said fulfillment agent and said charging agent is responsible for a predetermined function that is different from each predetermined function of each of the other of said management agent, said fulfillment agent and said charging agent; and

wherein each of said informational elements of each of said one through eighth messages is provided in a predetermined order and format acceptable to said agent that receives said messages and in which each of said management, fulfillment and charging agents initiates a predetermined response depending upon content of said messages.

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DERWENT-ACC-NO: 2000-223908
DERWENT-WEEK: 200019
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TITLE: Decision network that rates, prices or discounts transactions based on business rules stored in a price plan selects a particular price plan and an algorithm rule and conditions applicable to certain transactions.

INVENTOR: BOARDMAN, S; RUEBESAM, A

PATENT-ASSIGNEE:

ASSIGNEE	CODE
AMERICAN MANAGEMENT SYSTEMS INC	AMMAN

PRIORITY-DATA: 1999US-0353588 (July 15, 1999), 1998US-094459P (July 29, 1998)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
WO 200007354 A1	February 10, 2000	E	028	H04M015/00
AU 9953204 A	February 21, 2000		000	H04M015/00
EP 1101350 A1	May 23, 2001	E	000	H04M015/00

DESIGNATED-STATES: AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT UA UG US UZ VN YU ZW AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL OA PT SD SE SL SZ UG ZW AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE

APPLICATION-DATA:

PUB-NO	APPL-DATE	APPL-NO	DESCRIPTOR
WO 200007354A1	July 26, 1999	1999WO-US16790	
AU 9953204A	July 26, 1999	1999AU-0053204	
AU 9953204A		WO 200007354	Based on
EP 1101350A1	July 26, 1999	1999EP-0938799	
EP 1101350A1	July 26, 1999	1999WO-US16790	
EP 1101350A1		WO 200007354	Based on

INT-CL (IPC): G06 F 17/60; H04 M 15/00

RELATED-ACC-NO: 2000-183291;2000-183292

ABSTRACTED-PUB-NO: WO 200007354A
BASIC-ABSTRACT:

NOVELTY - Price plans and decision networks are stored and, in response to the telecommunications billing event to be priced, a processor traverses a plan selection rule and processing conditions within the plan selection rule to select a price plan applicable to the event. The processor then traverses an algorithm

selection rule set of the selected price plan and processing conditions within the algorithm selection rule set to select a pricing algorithm which is then used to price the event.

DETAILED DESCRIPTION - The conditions can have a range of applicability. Changing the decision network changes the business rules for the event without changing the algorithms or conditions. INDEPENDENT CLAIMS are included for

(a) a billing apparatus for telecommunications transactions

(b) and a computer readable medium storing a program causing a computer to price transactions.

USE - In commercial, customer transaction billing systems.

ADVANTAGE - The flexible arrangement allows the business plan to be changed quickly and easily to meet market demands.

CHOSEN-DRAWING: Dwg.0/8

TITLE-TERMS: DECIDE NETWORK RATE PRICE DISCOUNT TRANSACTION BASED BUSINESS RULE STORAGE PRICE PLAN SELECT PRICE PLAN ALGORITHM RULE CONDITION APPLY TRANSACTION

DERWENT-CLASS: S04 T01 T05 W01

EPI-CODES: S04-C03; T01-J05A1; T01-J05B; T01-S03; T05-G03; W01-C06;

SECONDARY-ACC-NO:
Non-CPI Secondary Accession Numbers: N2000-167854

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File: DWPI   Aug 14, 2001

DERWENT-ACC-NO: 2001-549991
DERWENT-WEEK: 200173
COPYRIGHT 2002 DERWENT INFORMATION LTD
TITLE: Method of capturing billing data for network server by transmitting billing data in event message according to preset format

INVENTOR: CLARKE, S; KING, P ; MCCONNELL, R ; MURPHY, D ; RODGERS, M

PATENT-ASSIGNEE:
ASSIGNEE   CODE
APION TELECOMS LTD   APION

PRIORITY-DATA: 2000IE-0000289 (April 13, 2000), 2000IE-0000108 (February 3, 2000)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
AU 200128766 A	August 14, 2001		000	H04L029/06
WO 200158110 A2	August 9, 2001	E	019	H04L029/06

DESIGNATED-STATES: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CR CU CZ DE DK DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZW

APPLICATION-DATA:

PUB-NO	APPL-DATE	APPL-NO	DESCRIPTOR
AU 200128766A	February 5, 2001	2001AU-0028766	
AU 200128766A		WO 200158110	Based on
WO 200158110A2	February 5, 2001	2001WO-IE00016	

INT-CL (IPC): H04 L 29/06

ABSTRACTED-PUB-NO: WO 200158110A
BASIC-ABSTRACT:

NOVELTY - Method consists in the application automatically generating billing data relating to a service it provides, automatically transmitting the data to the gateway in an event message according to a preset format and the gateway processing it.

DETAILED DESCRIPTION - There are INDEPENDENT CLAIMS for (1) a gateway for signals routing, (2) a billing system.

USE - Method is for billing in a network environment in which server applications communicate with clients via e.g. a WAP gateway.

ADVANTAGE - Method enables more flexible billing data processing in a network environment.

10/23/02 9:45 AM

DESCRIPTION OF DRAWING(S) - The figure shows a WAP gateway communicating with a server hosting e.g. on-line shopping applications.

CHOSEN-DRAWING: Dwg.1/1

TITLE-TERMS: METHOD CAPTURE BILL DATA NETWORK SERVE TRANSMIT BILL DATA EVENT MESSAGE ACCORD PRESET FORMAT

DERWENT-CLASS: W01 W02

EPI-CODES: W01-A06B7; W01-A06G3; W01-B05A1A; W01-C05B3; W01-C06; W02-C03C1A;

SECONDARY-ACC-NO:
Non-CPI Secondary Accession Numbers: N2001-408569

WEST

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DOCUMENT-IDENTIFIER: US 5694598 A
TITLE: Method for mapping data between a relational format and an object-oriented format

US PATENT NO. (1):
5694598

Detailed Description Text (60):
The mapping process can guarantee that the referenced datalists be consecutively stored in the list of instances of a TO-entity. Therefore, a pair of indices will suffice for each r-reference.

WEST

End of Result Set

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L9: Entry 2 of 2   File: USPT   Sep 24, 1996

DOCUMENT-IDENTIFIER: US 5560014 A
TITLE: Dynamic object management method in object oriented language

US PATENT NO. (1):
5560014

Brief Summary Text (12):
For achieving the aforesaid object, this invention provides an object oriented
language having a hierarchy of class objects describing slots for storing data and
methods consisting of groups of algorithms for conducting operations on the data and
having instance objects associated with the individual class objects, the dynamic
object management method being characterized in that the object oriented language is
provided with a group of meta operations for modifying the class objects and the
instance objects, a class object modification is conducted by using the group of
meta operations to obtain a floating class object that is a copy of the class
object, create a new class object by modifying the floating class object, and link
the new class object with the original class object by a link describing the
modification history of the floating class object, and an instance object
modification is conducted by using the group of meta operations to obtain a floating
instance object that is created by modifying an instance object, and linking the new
instance object with its original class object by a link describing the modification
history of the relationship between the new instance object and the class object.

CLAIMS:

1. A dynamic object management method in an object oriented language having a
hierarchy of class objects describing slots for storing data and object methods
consisting of groups of algorithms for conducting operations on the data and having
instance objects associated with the individual class objects, the dynamic object
management method comprising the steps of:

providing the object oriented language with a group of meta operators for modifying
the class objects and the instance objects, and

modifying an original class object according to the steps of

obtaining a floating class object that is a copy of a class object by using the
group of meta operators,

creating a new class object by modifying the floating class object, and

linking the new class object with the original class object by a link describing
both a history of the modification and a relationship between the new class object
and the original class object.

3. A dynamic object management method in an object oriented language having a
hierarchy of class objects describing slots for storing data and object methods
consisting of groups of algorithms for conducting operations on the data and having
instance objects associated with individual class objects, the dynamic object
management method comprising the steps of:

End of Result Set

File: USPT   Oct 28, 1997

L10: Entry 1 of 1

US-PAT-NO: 5682482
DOCUMENT-IDENTIFIER: US 5682482 A

TITLE: Facilitating the supplying of services in a network

DATE-ISSUED: October 28, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
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Lund; Robert M.	Boulder	CO		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Probita Inc.	Boulder	CO			02

APPL-NO: 08/ 557697   [PALM]
DATE FILED: November 13, 1995

PARENT-CASE:
This is a file wrapper continuation of application Ser. No. 08/224,857, filed on Apr. 8, 1994 abandoned.

INT-CL: [06] G06 F 17/60

US-CL-ISSUED: 395/242
US-CL-CURRENT: 705/42

FIELD-OF-SEARCH: 395/205, 395/226, 395/227, 395/235, 395/237, 395/239, 395/242, 395/208, 395/230

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
☐ 4656623	April 1987	Dalby, Jr. et al.	370/60
☐ 4799156	January 1989	Shavit et al.	364/401
☐ 4897867	January 1990	Foster et al.	379/94
☐ 4949248	August 1990	Caro	364/401
☐ 5262942	November 1993	Earle	364/408
☐ 5329589	July 1994	Fraser et al.	364/401

ART-UNIT: 241

PRIMARY-EXAMINER: McElheny, Jr.; Donald E.

ABSTRACT:

A network architecture is provided for enhanced support of network services. The architecture includes an operations gateway defined by a number of agents that take responsibility for accomplishing support system related functions including financial transaction functions. Messages are conveyed to the agents that have informational elements containing data or other information useful in accomplishing the necessary functions. Preferably, the network is defined to comprise one or more layers including a service layer, a service instance layer, a connection layer and a connection instance layer. Each layer has associated with it one or more management, fulfillment, charging and booking agents. The operations gateway enables service providers to rapidly introduce new services while optimizing the interchangeability of system components or equipment that are useful in supporting the network services.

30 Claims, 18 Drawing figures

DOCUMENT-IDENTIFIER: US 5682482 A
TITLE: Facilitating the supplying of services in a network

US PATENT NO. (1):
5682482

Detailed Description Text (4):
Essential to the present invention is an operations gateway 50 that interfaces with
the networks 18-30 and the support systems 14. The operations gateway 50 responds to
a predetermined protocol in taking responsibility for functions that need to be
accomplished in order to support the providing of services by the network 10. The
operations gateway 50 receives information and/or data from the network 10 that
enable it to respond in a manner that results in the accomplishment of the desired
functions. These functions include, for example, managing relationships between
service providers and service users, fulfilling service instances, determining an
amount to be billed for a specific service instance and crediting and/or debiting an
account related to a particular service instance. The accomplishment of these
functions is achieved primarily by means of the financial transaction system 32 and
other agent and network systems. It should be appreciated, however, that these are
only representative functions for the system 32 and further and/or other appropriate
functions can be accomplished by the system 32, as well as further and/or other
functions appropriate to systems 36-44.

Detailed Description Text (33):
Service.sub.-- instance.sub.-- request--a specialization of request used by agents
in the service instance layer and may include one or more of the following:
service.sub.-- instance.sub.-- user.sub.-- booking, service.sub.-- instance.sub.--
provider.sub.-- booking, service.sub.-- instance.sub.-- fa (fulfillment agent),
service.sub.-- instance.sub.-- ca (charging agent), service.sub.-- instance.sub.--
description, service.sub.-- instance.sub.-- accounting.sub.-- rules.

Detailed Description Text (47):
Referring to FIG. 3B, path 3 indicates the next step that is conducted for which the
fulfillment agent 108 takes responsibility, namely: 3) service.sub.--
instance.sub.-- req (session.sub.-- id, service.sub.-- user, service.sub.--
instance.sub.-- request). This message indicates that the FA.sub.s 108 has sent a
message to the appropriate or selected management agent (MA.sub.si) 116 of the
service instance layer 120. The service instance MA.sub.si 116 takes responsibility
for managing the financial transaction and fulfillment of the particular service
instance. In that regard, a message path 4 is provided, namely: 4) charging.sub.--
transaction.sub.-- req (session.sub.-- id, service.sub.-- user, service.sub.--
instance.sub.-- request). In accordance with this message, a financial transaction
is initiated. The particular charging agent 124 is identified by a service.sub.--
instance.sub.-- ca informational element, which is part of the service.sub.--
instance.sub.-- request. In addition, part of the service.sub.-- instance.sub.--
request includes a service.sub.-- instance.sub.-- user.sub.-- booking informational
element that identifies a booking agent to be used and also provides booking
information, e.g., is a credit check required before this particular service
instance delivery. As before, service.sub.-- user will identify the particular
service user and the session.sub.-- id will describe this particular current session
related to providing of this service instance. With regard to such a credit check,
path 5 provides a message generated using the charging agent 124 to an appropriate
or selected booking agent (BA.sub.si) 128 associated with the service instance layer
120. The message along this path is defined as: 5) check.sub.-- credit
(session.sub.-- id, service.sub.-- user, service.sub.-- instance.sub.-- amount). In

accordance with this message, the BA.sub.si 128 checks the user's credit using the information found in the service.sub.-- user informational element based on the data in the informational element service.sub.-- instance.sub.-- amount. The associated or underlying agent system(s) 66 actually perform(s) the function(s) for checking credit. If satisfactory, the available credit is decremented in accordance with the data or amount set forth in the designated informational element. In accordance with path 6, the BA.sub.si 128 sends a message to CA.sub.si 124 acknowledging the credit check and which message is defined as: 6) check.sub.-- credit.sub.-- ack (session.sub.-- id). Next, the CA.sub.si 124 takes responsibility for charging for the fulfillment of the particular service instance, namely: 7) charging.sub.-- transaction.sub.-- ack (session.sub.-- id, service.sub.-- instance.sub.-- request). In accordance with this message, the service.sub.-- instance.sub.-- request informational element includes information and/or data associated with service.sub.-- instance.sub.-- accounting.sub.-- rules, which specify, for example, the rules or algorithm to financially account for the fulfillment accomplished in connection with the particular service instance. For example, the agent 124 takes responsibility for associating with one or more appropriate or selected agent systems 66 that periodically (time or service unit based) account for the service instance and take into account the resource units that might be required for any necessary charging function. In that regard, the resource units may be expressed in a general way so that the accounting rules need not be limited to a particular fulfillment agent.

Detailed Description Text (59):
With regard to the first network connection.sub.-- instance, the CA.sub.ci 148 sends an acknowledgement to the MA.sub.ci 136. This acknowledgement message is provided in accordance with path 11 and is identified as: 11) charging.sub.-- transaction.sub.-- ack (session.sub.-- id, connection.sub.-- instance.sub.-- request). In this message, the connection.sub.-- instance.sub.-- request informational element includes connection.sub.-- instance.sub.-- request.sub.-- accounting.sub.-- rules that specify how often an accounting for the fulfillment of this particular network connection.sub.-- instance must be made, e.g., upon completion, periodically (time or service unit based) and resource units required for rating by the CA.sub.ci 148. Likewise, for the second network connection.sub.-- instance along path 11', a message is identified as: 11') charging.sub.-- transaction.sub.-- ack (session.sub.-- id, connection.sub.-- instance.sub.-- request). The same type of acknowledgement is provided to the MA.sub.ci 144 by the CA.sub.ci 152 as it relates to the second network connection.sub.-- instance.

Detailed Description Text (62):
In taking responsibility for handling of the booking associated with the first network connection.sub.-- instance, the CA.sub.ci 148 is involved in sending a message to a booking agent (BA.sub.ci) 170 of the connection instance layer 140, which is defined as: 15) debit (session.sub.-- id, connection.sub.-- instance.sub.-- request.sub.-- connection.sub.-- user.sub.-- booking, amount). This message indicates that for the current session as described, an amount is to be booked or debited to a particular account, which is, typically, the connection.sub.-- instance user's account and in which the BA.sub.ci 170 takes responsibility for accomplishing the functions associated therewith. Likewise, for the second network connection.sub.-- instance, a similar message is provided along path 15', namely: 15') debit (session.sub.-- id, connection.sub.-- instance.sub.-- request.sub.-- connection.sub.-- user.sub.-- booking, amount). This message is received by the booking agent (BA.sub.ci) 174 of the connection instance layer 140.

Detailed Description Text (63):
With regard to crediting an account associated with each of these two network connections, paths 16 and 16' are denoted with accompanying messages that can be identified as: 16) credit (session.sub.-- id, connection.sub.-- instance.sub.-- request.sub.-- provider.sub.-- booking, amount) and 16') credit (session.sub.-- id, connection.sub.-- instance.sub.-- request.sub.-- connection.sub.-- provider.sub.-- booking, amount). A booking agent (BA.sub.ci) 178 and a booking agent (BA.sub.ci) 182, respectively, receive these messages. Each of these two booking agents 178, 182 is identified in the respective messages and take responsibility for crediting a specified amount based on the particular network connection.sub.-- instance, which is identified using the current session informational element. Typically, the provider of the network connection.sub.-- instance service has its account credited.

Detailed Description Text (66):

With continued reference to FIG. 3F, the MA.sub.c 184 also takes responsibility for initiating a message from the connection layer 130 to the service instance layer 120 in light of the completion of the particular service instance. More specifically, the MA.sub.c 184 sends a message along path 17 to the fulfillment agent 132 (FA.sub.si). This message is defined as: 17) connection.sub.-- released (session.sub.-- id). Similarly, the MA.sub.c 192 initiates a message along path 17' to the FA.sub.si 132, which is defined as: 17') connection.sub.-- released (session.sub.-- id). The FA.sub.si 132 takes responsibility for handling the information related to the release of each of the two network connections for the current session that is identified in the respective messages. Additionally, the FA.sub.si 132 takes responsibility for reporting service instance resource usage for the current session to the MA.sub.si 116 in accordance with the message: 18) service.sub.-- released (session.sub.-- id, service.sub.-- instance.sub.-- resources). Next, a message along path 19 is provided: 19) charge.sub.-- transaction (session.sub.-- id, service.sub.-- instance.sub.-- resources). This message is sent to the CA.sub.si 124, which takes responsibility for charging appropriate accounts based on resource unit usage in the service instance layer 120 and based on predetermined rules or algorithms. The CA.sub.si 124 is also responsible for using agent systems to accomplish these functions including the determination of the amounts to be booked. In that regard, along path 20, a message is sent defined as: 20) debit (session.sub.-- id, service.sub.-- instance.sub.-- request.sub.-- user.sub.-- booking, amount), the BA.sub.si 128 takes responsibility for debiting the amount to the appropriate account based on the content of the informational elements in the message. Similarly, along path 21, the proper account is credited for the particular service instance in accordance with the following: 21) credit (session.sub.-- id, service.sub.-- instance.sub.-- request.sub.-- user.sub.-- booking, amount). The data and/or information associated with this message is used by the BA.sub.si 186 in crediting the appropriate provider account for the service instance that was just delivered.

Detailed Description Text (68):
In continuing with the explanation of the present invention, the foregoing general example is applied to a specific service instance application. Specifically, a video on demand service is presented as an example in which the user requests a movie. In this example, the provider of the service instance and the provider of the network connection.sub.-- instances are separate business entities. The user has chosen to pay for each and any service, service instance, connection and connection.sub.-- instance charges by credit card.

Detailed Description Text (71):
In accomplishing these functions, the MA.sub.s 208 is involved with sending a message along path 2 to a fulfillment agent (FA.sub.s) 212 in the service layer, which is defined as: 2) service.sub.-- req (session.sub.-- id, service.sub.-- user, service.sub.-- request). In accordance with this message, the service user of the service layer is identified as making a service request with the current session.sub.-- id describing the particular service being requested as it relates to fulfilling a video on demand service. The FA.sub.s 212 takes responsibility for fulfilling the particular service instance and in selecting the appropriate management agent for delivery of the desired service instance (providing the movie selected by the user). In doing this, the FA.sub.s 212 takes responsibility for a message being sent along path 3 to a management agent (MA.sub.si) 216 in the service instance layer. This message is denoted as: 3) service.sub.-- instance.sub.-- req (session.sub.-- id, service.sub.-- user, service.sub.-- instance.sub.-- request). In accordance with this message, the MA.sub.si 216 manages the financial transaction and fulfillment of the service instance associated with providing the particular movie using the video on demand service. With regard to managing the financial transaction, the MA.sub.si 216 takes responsibility for sending a message along path 4 to a charging agent (CA.sub.si) 220 in the service instance layer, in accordance with the following: 4) charging.sub.-- transaction.sub.-- req (session.sub.-- id, service.sub.-- user, service.sub.-- instance.sub.-- request). The particular charging agent 220 is specified by the content of the informational element service.sub.-- instance.sub.-- ca, which is part of the service.sub.-- instance.sub.-- request. Also part of the service.sub.-- instance.sub.-- request informational element is a service.sub.-- instance.sub.-- user.sub.-- booking, which identifies both the booking agent to be used and also provides booking information, e.g., is a credit check required before delivery of this service instance. Next, the CA.sub.si 220 takes responsibility for a message that is received by a booking agent (BA.sub.si) 224 of the service instance layer along path 5 and which message is defined as: 5) check.sub.-- credit (session.sub.-- id, service.sub.-- user,

service.sub.-- instance.●b.-- amount). The BA.sub.si 224 checks this service user's credit for the amount identified in the message. If the credit is satisfactory, the BA.sub.si 224 decrements available credit by this amount. In acknowledging the credit check, the BA.sub.si 224 takes responsibility for sending a message back to the CA.sub.si 220 acknowledging the credit check of the service user in accordance with the message path defined as: 6) check.sub.-- credit.sub.-- ack (session.sub.-- id). This message indicates to the CA.sub.si 220 that, for the current session.sub.-- id directed to the particular movie being requested, the user's credit has been checked and found satisfactory for fulfilling or delivering this particular movie. The CA.sub.si 220 then takes responsibility for sending a message to the MA.sub.si 216, which message relates to accounting for the fulfillment of the service instance (delivery of a movie using a video on demand service). More specifically, along path 7, the following message is defined: 7) charging.sub.-- transaction.sub.-- ack (session.sub.-- id, service.sub.-- instance.sub.-- request). With this message, the MA.sub.si 216 receives information directed to describing the current session and the service instance request includes service.sub.-- instance.sub.-- request.sub.-- accounting sub.-- rules, which specify how often an accounting for this particular fulfillment must be made, such as upon completion of the movie being sent to the user or periodically, based on time or service units and the resource units for charging or rating that are required by the CA.sub.si 220.

Detailed Description Text (79):
Referring to FIG. 4B, the CA.sub.ci 244 is involved with a message being sent to each of two management agents in the connection instance layer, which messages are identified as: 11) charging.sub.-- transaction.sub.-- ack (session.sub.-- id, connection.sub.-- instance.sub.-- request) and 11') charging.sub.-- connection.sub.-- instance.sub.-- transaction.sub.-- ack (session.sub.-- id, connection.sub.-- instance.sub.-- request). Each of these acknowledging messages contain information or data that specifies how often an accounting for the fulfillment of this network connection.sub.-- instance must be made for the particular movie that is being transmitted, just as was done in the other layers. Such information or data related to the accounting is contained in the connection.sub.-- instance.sub.-- request.sub.-- accounting sub.-- rules informational element which may include information that the accounting for this connection.sub.-- instance fulfillment is to made upon completion of the particular network connection.sub.-- instance or on a periodic basis, based on time and/or service units. Suchinformation is also expected to include the resource units for rating that are required by the CA.sub.ci 244.

Detailed Description Text (81):
With reference to FIG. 4C, the description of the example is continued with the video on demand service having been completed. Specifically, along paths 12.6 and 12.6', messages that originate in the service instance layer involving the FA.sub.si 224 are received by connection layer management agents MA.sub.c 282 and MA.sub.c 284, respectively, and which are denoted as: 12.6) release.sub.-- connection (session.sub.-- id) and 12.6') release.sub.-- connection (session.sub.-- id). Each of these received messages provides information to the respective management agents 282, 284 that the current session being described is now finished and these two agents must take responsibility for managing the release of the previously formed connections. In doing so, the FA.sub.c 288 and the FA.sub.c 286 receive messages initiated by the MA.sub.c 282 and the MA.sub.c 284 along paths 12.7 and 12.7', namely: 12.7) release.sub.-- connection (session.sub.-- id) and 12.7') release.sub.-- connection (session.sub.-- id). In accordance with these messages, each of the MA.sub.c 282 and the MA.sub.c 284 takes responsibility for managing the appropriate fulfillment agents which, in turn, assume responsibility for releasing the first and second network connections made with the necessary communications or other service-related networks because the delivery of the particular movie to the user has been completed. In that regard, the FA.sub.c 288 initiates a message along path 12.75 to the connection instance layer. That is, a message is received by the MA.sub.ci 236. Similarly, the FA.sub.c 288 initiates a message along path 12.75' to the MA.sub.ci 240 in the connection instance layer related to releasing the specific network connections that were utilized in delivery of the particular movie. These messages along paths 12.75 and 12.75' are defined as: 12.75) release.sub.-- connection.sub.-- instance (session.sub.-- id) and 12.75') release.sub.-- connection.sub.-- instance (session.sub.-- id). Each of these received messages provides information to the respective management agents 236, 240 that the current session being described is now finished and these two agents must take responsibility for managing the release of the previously formed connection.sub.-- instances. In order to do so, the FA.sub.ci 248 and the FA.sub.ci 252 receive messages initiated by the MA.sub.ci 236 and the MA.sub.ci 240 along paths 12.76 and

12.76', namely: 12.76) release.sub.-- connection.sub.-- instance (session.sub.-- id) and 12.76') release.sub.-- connection.sub.-- instance (session.sub.-- id). In accordance with these messages, each of the MA.sub.ci 236 and the MA.sub.ci 240 takes responsibility for managing the appropriate fulfillment agents which, in turn, assume responsibility for releasing the dynamically generated network connection.sub.-- instances, since the delivery of the particular movie to the user has been completed. The FA.sub.ci 248 and the FA.sub.ci 252 also take responsibility for generating proprietary messages that disconnect this previously provided communication paths through the network 232 along paths 12.8 and 12.8'. Referring next to FIG. 4D, messages are initiated by the FA.sub.ci 248 and the FA.sub.ci 252 that are received by the MA.sub.ci 236 and the MA.sub.ci 240 along paths 13 and 13' which are defined as: 13) connection.sub.-- instance.sub.-- released (session.sub.-- id, connection.sub.-- instance.sub.-- resources) and 13') connection.sub.-- instance.sub.-- released (session.sub.-- id, connection.sub.-- instance.sub.-- resources). In accordance with these messages, information is provided that the network connection.sub.-- instances are released and resource usage is reported to these management agents, who will take responsibility for managing the charging associated with the network connection.sub.-- instances that delivered the selected movie. In that regard, the CA.sub.ci 244 receives messages along paths 14 and 14' that are identified as: 14) charge.sub.-- transaction (session.sub.-- id, connection.sub.-- instance.sub.-- resources) and 14') charge.sub.-- transaction (session.sub.-- id, connection.sub.-- instance.sub.-- resources). In accordance with these messages, the charging agent 244 takes responsibility for determining and charging the amount for these network connection.sub.-- instances associated with the particular service instance. As part of this responsibility, the CA.sub.ci 244 is responsible for sending messages that are received by one or more booking agents. In particular, a booking agent (BA.sub.ci) 260 is responsible for functions related to the debiting of the user's account. In the present example, this involves a credit card whereby the appropriate account in the credit card company 264 is debited for these network connection.sub.-- instances. Similarly, the booking agent (BA.sub.ci) 268 receives a message that results in the BA.sub.ci 268 taking responsibility for crediting the accounts receivable 272 of the connection.sub.-- instance (network) owner, based on data and/or other information for which the CA.sub.ci 244 takes responsibility. These messages are identified as follows:

Detailed Description Text (86):
As with the previous description given in connection with the general example of FIGS. 3A-3E, messages are sent to agents, along the paths identified in FIG. 4D, related to accomplishing the necessary functions and to generating further messages and sending them to agents in the connection, service instance and service layers directed to the release of the network connections, the release of the service instance and the release of the service, together with information and data that enables the connection (communication or other service related network connection that was required to deliver the movie), service instance (delivery of the movie) and service (video on demand) to be charged and booked using appropriate agents and agent systems, including an accounts receivable 276 associated with the provider or server 228 for the service, service instant and "static" connections related to the delivery of the movie. These messages are defined as:

CLAIMS:

6. A method, as claimed in claim 2, wherein:

said charging agent is used in providing a ninth message that is sent to a booking agent for taking responsibility in connection with crediting or debiting an account related to said first service instance.

28. An architecture, as claimed in claim 20, wherein:

said plurality of agents includes a booking agent that receives a message from said charging agent, with said booking agent taking responsibility for debiting or crediting an account of the first user in connection with said first service instance.

10/23/02 11:04

DOCUMENT-IDENTIFIER: US 5630127 A
TITLE: Program storage device and computer program product for managing an event driven management information system with rule-based application structure stored in a relational database

US PATENT NO. (1):
5630127

Detailed Description Text (50):
GRMs adds a table driven structure in front of these accessing programs so that the attribute representations can be referenced by name; these names can be thought of as variables that would appear in mathematical formulas. An example of this table is shown in FIG. 3. The names or "objects" are shown in the columns "OBJECT" 302, "OBJECT1" 304 and "OBJECT2" 308. These names or "objects" stand for a multitude of particular instances of the data, any of which can be retrieved by specifying the identifiers of the entities listed above which would focus the access on a particular representation value.

Detailed Description Text (326):
The Object Instance entity on the primary node stores all the values retrieved and calculated during the execution of queries/reports. These values are sent, through activity management, to the secondary nodes where the queries/reports were requested, and stored in this entity. Users can use these object instance values in performing risk and other "what if" analysis by changing the object instance values and running local queries/reports.

Detailed Description Text (364):
The GRMS Data Classes subject areas represent Exposure, Risk, GRMS Factors, Object Instance data and their relationships to those CMIM entities whose IDs are used within the keys. GRMS Data Classes contain the data created and used by the GRMS unique risk factors (e.g., credit risk factors) and specific instances of data to be analyzed within GRMS. The subject area contains the following entities:

Detailed Description Text (375):
Whenever an object routine is executed, it places the returned value in the Object Instance entity. After executing a query/report, all the Object Instance values resulting from that query/report can be downloaded to the workstation for analysis. This analysis allows the query/report can be re-run on the workstation, whose object routines will find their values in the Object Instance entity. By changing these values and re-running queries/reports, the business professional can perform "what if" analysis.

Detailed Description Text (430):
The following is a description of Entity Type: Instance 1408:

Detailed Description Text (441):
This relates an object and access type with the value in the object instance entity.

Detailed Description Text (452):
--Relationship Type: CUSTOMER ACCOUNT.Identifies.Obj Instance

Detailed Description Text (453):
Relates object instances to CUSTOMER ACCOUNT portion of CMIM key.

Detailed Description Text (458):
--Relationship Type: FIRM_ACCOUNT.Identifies.Obj_Instance

Detailed Description Text (459):
Relates object instances with the FIRM ACCOUNT portion of the CMIM key.

Detailed Description Text (470):
This relates an object and access type with the value in the object instance entity.

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L12: Entry 1 of 1   File: USPT   Oct 28, 1997

DOCUMENT-IDENTIFIER: US 5682482 A
TITLE: Facilitating the supplying of services in a network

US PATENT NO. (1):
5682482

Detailed Description Text (22):
BA: booking agent--responsible for financial transfers relative to users and
providers for services, service instances, network connections or network
connection.sub.-- instances (depending upon network layer)

DOCUMENT-IDENTIFIER: US 5682482 A
TITLE: Facilitating the supplying of services in a network

US PATENT NO. (1):
5682482

Detailed Description Text (68):
In continuing with the explanation of the present invention, the foregoing general example is applied to a specific service instance application. Specifically, a video on demand service is presented as an example in which the user requests a movie. In this example, the provider of the service instance and the provider of the network connection.sub.-- instances are separate business entities. The user has chosen to pay for each and any service, service instance, connection and connection.sub.-- instance charges by credit card.

End of Result Set

L12: Entry 1 of 1   File: USPT   Oct 28, 1997

DOCUMENT-IDENTIFIER: US 5682482 A
TITLE: Facilitating the supplying of services in a network

US PATENT NO. (1):
5682482

Detailed Description Text (22):
BA: booking agent--responsible for financial transfers relative to users and providers for services, service instances, network connections or network connection.sub.-- instances (depending upon network layer)

End of Result Set

☐ [Generate Collection] [Print]

L9: Entry 1 of 1   File: USPT   May 13, 1997

US-PAT-NO: 5630127
DOCUMENT-IDENTIFIER: US 5630127 A

TITLE: Program storage device and computer program product for managing an event driven management information system with rule-based application structure stored in a relational database

DATE-ISSUED: May 13, 1997

INVENTOR-INFORMATION:

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Poulos; Lori J.	McLean	VA		
DeFazio; Lynn G.	Manassas	VA		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
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APPL-NO: 08/ 485897   [PALM]
DATE FILED: June 7, 1995

PARENT-CASE:
This application is a division of application Ser. No. 07/883,460, filed May 15, 1992, now U.S. Pat. No. 5,446,885.

INT-CL: [06] G06 F 17/30

US-CL-ISSUED: 395/615; 395/10, 395/54, 395/201, 395/210
US-CL-CURRENT: 707/103R; 705/1, 705/10, 706/50, 707/104.1

FIELD-OF-SEARCH: 395/600, 395/10, 395/54, 364/401, 364/408

PRIOR-ART-DISCLOSED:

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[Search Selected] [Search ALL]

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ART-UNIT: 237

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ABSTRACT:

A rule-based application structure utilizes rules which are stored separately from application programs. The rules are stored in a relational database as objects. A user can modify existing rules and create new rules which are then restored in the database. Because rules are stored as objects in the database, they are easy to locate and retrieve. Because the rules are separate from the application programs, modifications to the rules are easier to accomplish.

16 Claims, 14 Drawing figures

10/23/02 11 02

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File: USPT

May 13, 1997

DOCUMENT-IDENTIFIER: US 5630127 A
TITLE: Program storage device and computer program product for managing an event driven management information system with rule-based application structure stored in a relational database

US PATENT NO. (1):
5630127

Drawing Description Text (6):
FIG. 4 is an object instance table.

Detailed Description Text (80):
The processor then would check for a prior retrieval of this value in its Object Instance table (for example, 400 of FIG. 4) associated with this report. Since this is the first access, the table would be empty, and the program would complete the processing of the retrieval from the actual database. Once the value is retrieved, the last action before returning would be the creation of an entry in the GRMS Object Instance Table for the value. This entry is shown as the first row 410 of the table 400 in FIG. 4. A similar processing would be done for the "Currency.sub.-- Exch.sub.-- Rate", which would result in the second entry in the table 400 of FIG. 4. Each time a rule is executed, an object instance table containing the primitive value used by the rule is created.

Detailed Description Text (82):
The accessing of "Option.sub.-- Value" proceeds along similar lines, although now the program called is not merely accessing the value, but calculating it. I% in turn will need to access the object table to have values retrieved for it for the object "Option.sub.-- Duration" and "Option.sub.-- Strike.sub.-- Price". It will use the GRMS processor 108 to achieve this access. As before, the retrieved instances of the objects will be stored in the Object Instance table, in this case in rows 3 414 and 4 416 of FIG. 4.

Detailed Description Text (83):
Once the program returns the value for the "Option.sub.-- Value", the GRMS Process 108 now has the values for both objects in the initial expression and can calculate the actual value for the Option.sub.-- Exposure as the product of the two values. At this point the value is returned and placed into the report that is shown to the customer. As part of this report process, the Object Instance table 400 created in this processing and shown in FIG. 4 is returned to the Business Professional's workstation 118 for reference purposes.

Detailed Description Text (84):
An additional feature of the GRMS architecture is the placement of the GRMS processor on the Business Professional's workstation 118 along with the Object Table 300, and the programs defined in the object table 300. Since the object instance table 400 is also present, the Business Professional can change values in the Object Instance table (via GRMS screens and functions) and reprocess the report on the workstation. All object accesses will be satisfied by the Object Instance table function and therefore, the CMIM database 224 is not needed for this "What if" analysis reporting.

Detailed Description Text (87):
This final program would follow the standard accessing protocol described above. In execution, this translated program is executed in a similar manner to the

10/23/02 10

interpretive proces⬤g of the GRMS Processor, but w⬤d be faster. An object instance table would be created per each report request as objects are accessed and values retrieved.

Detailed Description Text (100):
For example, in FIG. 14 the data block labelled "Obj to Mod" 1410 is the table referred to in the description as the Object Table 300 ("Module" is a technical term for program). The data block labelled "Object Instance" 1408 represents the Object Instance table 400 in the description. "Data Obj Def" 1402 refers to a definition of the object to be retrieved in terms of its data type (e.g., Integer or Character), length, significance if a decimal point is involved, etc. The additional data in the diagram describes the messaging connectivity of the systems.

Detailed Description Text (147):
When a query is run on the host, all of the data used in running that query is stored in an "Object Instance Table." This table is sent to the business professional at his/her workstation and contains a diverse set of information: product names, customer identifiers, exposure values, risk factors-everything that was calculated as part of the query or found in any database table.

Detailed Description Text (150):
To support additional analysis, the object instance table can be imported into spreadsheet, graphics, or other analytical tools.

Detailed Description Text (151):
GRMS uses the CMIS database which is a relational database established and shared by other CMIS Applications (i.e., Customer Information, Product Management and Balance Sheet and Liquidity Management). The Integrated Database Component unites the various databases that comprise the GRMS system, as illustrated in FIG. 7. This figure shows configuration with multiple primary nodes 704 and 706. The Enterprise Database 702 would be the one for the entire bank while the other primary nodes' databases would reflect data for subunits of the enterprise (e.g., a domestic unit, foreign unit or foreign regional). Also illustrated is the connection 708 between a primary node (in this case the Enterprise node 702) and a workstation where the database (primary node) and the data tables 710 (secondary workstation node) are related by the Integrated Database components in each. Finally, the figure illustrates the connection of the object instance table 712 that, as a result of a query or report, is developed on the primary node and transferred to the secondary mode for use in query and report interpretation and risk analysis.

L10: Entry 1 of 1   File: USPT   Oct 28, 1997

DOCUMENT-IDENTIFIER: US 5682482 A
TITLE: Facilitating the supplying of services in a network

US PATENT NO. (1):
5682482

Brief Summary Text (14):
The functions of the invention are preferably implemented by: defining layers that
include a service layer, a service instance layer, a connection layer, and a
connection instance layer; establishing an operations gateway comprised of one or
more agents which constitute a defined interface which takes responsibility for
accomplishment of desired support functions for the operations of a network upon
receipt of a message from a sender; providing for defined messages comprised of
defined informational elements, which messages are sent by at least one sender to at
least one agent, including at least one message associated with at least one
service, for the purpose of having the agent initiate the necessary functions by
appropriate agent systems; having the senders be agents, agent systems, and network
systems; having such operation functions performed by agent systems, which systems
are invoked by the agents; not having agents perform any of the operations
functions; having one or more agents which include management agents, fulfillment
agents, charging agents, and booking agents; having one or more agent systems for
performing the management of the service, fulfillment of the service, the charging
of the service and the booking of the service; having the agents take responsibility
for invoking agent systems in one or more of the defined layers in the
communications network.

Brief Summary Text (15):
In performing functions, management agents associated with one or more of the
service, service instance, connection and connection instance layers receive
messages having informational elements that contain data or other information
necessary for the agents to take responsibility for accomplishing the management
related functions. Among other responsibilities, the management agents are
responsible for invoking appropriate fulfillment agents and charging agents. The
fulfillment agents are responsible for fulfilling the desired function or functions
associated with a particular layer, such as fulfilling the particular service
instance and providing the necessary network connection or connections for delivery
of the service instance. In one application, the service instance relates to the
delivery of a specific movie pursuant to a video on demand service. The charging
agents take responsibility for determining an amount, such as an amount related to
the cost of providing network connections and/or the delivery of the particular
service instance. The charging agents also are responsible for invoking appropriate
booking agents, which take responsibility for debiting and/or crediting proper
accounts using the amount.

Detailed Description Text (6):
With respect to achieving the communication that is required for the agent interface
58 and its associated agents 54 in conjunction with taking on the responsibility for
accomplishing the functions, messages are sent or inputted to the agent interface 58
by message senders. Each message includes common information. In particular, each
message can be defined as including a number of informational elements that include
data and/or other information useful in implementing the functions. In the context
of financial transaction related functions, such informational elements may include
service request information, service instance request information and connection
request information that relate to a service to be supplied by a provider to a user

and how a particular service_instance is to be charged. Other informational elements may contain booking data describing a particular booking to be used for a user or a provider, fulfillment agent data describing a fulfillment agent to be used for fulfilling a request, charging agent data describing a charging agent to be used in charging an amount associated with a request, description data describing a particular request and/or accounting rules used in determining an amount to charge. Informational elements that are more general or more common among a plurality of messages include: an identification of a user of a particular service, an identification of a provider of the particular service, a type of information that is related to the particular service, such as a voice communication service or a video on demand service, and a session.sub.-- id that describes the particular service, such as the providing of an identified movie.

Detailed Description Text (21):
CA: charging agent--responsible for charging for services, service instances, network connections or network connection.sub.-- instances (depending upon the network layer).

Detailed Description Text (33):
Service.sub.-- instance.sub.-- request--a specialization of request used by agents in the service instance layer and may include one or more of the following: service.sub.-- instance.sub.-- user.sub.-- booking, service.sub.-- instance.sub.-- provider.sub.-- booking, service.sub.-- instance.sub.-- fa (fulfillment agent), service.sub.-- instance.sub.-- ca (charging agent), service.sub.-- instance.sub.-- description, service.sub.-- instance.sub.-- accounting.sub.-- rules.

Detailed Description Text (35):
Connection.sub.-- instance.sub.-- request--a specialization of request used by agents in the connection layer and may include one or more of the following: connection.sub.-- user.sub.-- booking, connection.sub.-- provider.sub.-- booking, connection.sub.-- fa (fulfillment agent), connection.sub.-- ca (charging agent), connection.sub.-- description, and connection.sub.-- accounting.sub.-- rules.

Detailed Description Text (37):
Service.sub.-- instance.sub.-- amount--refers to an amount to be charged for a service_instance.

Detailed Description Text (39):
Connection.sub.-- instance.sub.-- amount--refers to an amount to be charged related to a connection.sub.-- instance.

Detailed Description Text (46):
With respect to the relevant paths for providing the service, FIG. 3A illustrates a service layer 100 with a number of agents 54 associated therewith including: a management agent 104 for the service layer (MA.sub.s); a fulfillment agent 108 for the service layer (FA.sub.s); and a charging agent 112 for the service layer (CA.sub.s). FIG. 3A also identifies message paths for sending requests to agents, namely: path 1 to MA.sub.s 104 from a user, which request may emanate from a network system 70, for example. In connection with describing what occurs, a message connotation is provided associated with path 1, namely: 1) service.sub.-- req (session.sub.-- id, user, provider, service.sub.-- request). In accordance with this message representation, the term "service.sub.-- req" represents a message label and the terms within the parentheses identify the informational elements that contain data or other information. In particular, a request is made from a user for a service request. The "user" informational element identifies the user of the service. The "provider" identifies a provider and is optional information. The "session.sub.-- id" describes the service being requested by the user. The MA.sub.s 104 manages the relationship between the service user and the service provider. It takes responsibility for invoking the fulfillment agent (FA.sub.s) 108 and the charging agent (CA.sub.s) 112 in the service layer 100. With regard to invoking the charging agent in the service layer 100, the MA.sub.s 104 takes responsibility for sending a message along path 1.1 to the charging agent 112, with the message being defined as: 1.1) charging.sub.-- transaction.sub.-- req (session.sub.-- id, user, service.sub.-- request). This message label indicates that a financial transaction is being requested for the service over the network 10. This charging agent CA.sub.s 112 is responsible for determining the parameters associated with the particular service instance. The particular service to be provided is described in the session.sub.-- id and the identity of the user for the service is also provided in the message. The CA.sub.s 112 takes responsibility for specifying how often an

10/23/02 11:01

accounting must be m⬤ for the fulfillment taking pl⬤ in the service layer 100. This is done in accordance with message path 1.2, namely: 1.2) charging.sub.-- transaction.sub.-- ack (session.sub.-- id, service.sub.-- request). In this message, the service.sub.-- request includes service.sub.-- request.sub.-- accounting.sub.-- rules, which specifies how often an accounting for this fulfillment must be made, e.g., upon completion, periodically (time or service unit based) and resource units required for rating by this CA.sub.s 112. The informational element service.sub.-- request also includes a service.sub.-- request.sub.-- service.sub.-- ca that specifies the particular charging agent to be used for the service instance requested by the user. The MA.sub.s 104 also selects the particular fulfillment agent 108, typically based on a service profile generated as a function of at least the identity of the user, the particular service request and, optionally, the identity of a provider. With respect to path 2, the message can be characterized as: 2) service-req (session.sub.-- id, service.sub.-- user, service.sub.-- request). This message label indicates that a service request is sent to the fulfillment agent 108 denoted by service.sub.-- fa informational element of the service.sub.-- request, by the management agent 104 for the identified service.sub.-- user, with the particular service session.sub.-- id being described. Similarly, the particular charging agent 112 associated with the service.sub.-- request is denoted using the service.sub.-- ca informational element. In the case of FIG. 3A, the FA.sub.s 108 represents and is responsible for handling the service instance that is to be used and which is associated with the general category of the service, such as video on demand.

Detailed Description Text (47):
Referring to FIG. 3B, path 3 indicates the next step that is conducted for which the fulfillment agent 108 takes responsibility, namely: 3) service.sub.-- instance.sub.-- req (session.sub.-- id, service.sub.-- user, service.sub.-- instance.sub.-- request). This message indicates that the FA.sub.s 108 has sent a message to the appropriate or selected management agent (MA.sub.si) 116 of the service instance layer 120. The service instance MA.sub.si 116 takes responsibility for managing the financial transaction and fulfillment of the particular service instance. In that regard, a message path 4 is provided, namely: 4) charging.sub.-- transaction.sub.-- req (session.sub.-- id, service.sub.-- user, service.sub.-- instance.sub.-- request). In accordance with this message, a financial transaction is initiated. The particular charging agent 124 is identified by a service.sub.-- instance.sub.-- ca informational element, which is part of the service.sub.-- instance.sub.-- request. In addition, part of the service.sub.-- instance.sub.-- request includes a service.sub.-- instance.sub.-- user.sub.-- booking informational element that identifies a booking agent to be used and also provides booking information, e.g., is a credit check required before this particular service instance delivery. As before, service.sub.-- user will identify the particular service user and the session.sub.-- id will describe this particular current session related to providing of this service instance. With regard to such a credit check, path 5 provides a message generated using the charging agent 124 to an appropriate or selected booking agent (BA.sub.si) 128 associated with the service instance layer 120. The message along this path is defined as: 5) check.sub.-- credit (session.sub.-- id, service.sub.-- user, service.sub.-- instance.sub.-- amount). In accordance with this message, the BA.sub.si 128 checks the user's credit using the information found in the service.sub.-- user informational element based on the data in the informational element service.sub.-- instance.sub.-- amount. The associated or underlying agent system(s) 66 actually perform(s) the function(s) for checking credit. If satisfactory, the available credit is decremented in accordance with the data or amount set forth in the designated informational element. In accordance with path 6, the BA.sub.si 128 sends a message to CA.sub.si 124 acknowledging the credit check and which message is defined as: 6) check.sub.-- credit.sub.-- ack (session.sub.-- id). Next, the CA.sub.si 124 takes responsibility for charging for the fulfillment of the particular service instance, namely: 7) charging.sub.-- transaction.sub.-- ack (session.sub.-- id, service.sub.-- instance.sub.-- request). In accordance with this message, the service.sub.-- instance.sub.-- request informational element includes information and/or data associated with service.sub.-- instance.sub.-- accounting.sub.-- rules, which specify, for example, the rules or algorithm to financially account for the fulfillment accomplished in connection with the particular service instance. For example, the agent 124 takes responsibility for associating with one or more appropriate or selected agent systems 66 that periodically (time or service unit based) account for the service instance and take into account the resource units that might be required for any necessary charging function. In that regard, the resource units may be expressed in a general way so that the accounting rules need not be limited to a particular

fulfillment agent.

Detailed Description Text (49):
Continuing with the description in the connection layer 130 for this general example, the FA.sub.si 132 takes responsibility for sending necessary messages to initiate one or more network connections that are required to deliver the particular requested service, i.e., takes care of establishing physical connections to and/or among one or more of the necessary communication or other service-related networks required to deliver the particular service. In the general example, two different network connections are represented. With reference to FIG. 3C, the FA.sub.si 132 takes responsibility for a message along path 9.1 to management agent (MA.sub.c) 184 in the connection layer 130. This message is defined as: 9.1) connection.sub.-- req (session.sub.-- id, connection.sub.-- user, connection.sub.-- request). In accordance with this message, the FA.sub.si 132 initiates a first network connection request to an appropriate and selected management agent for the connection layer 130. In so doing, a connection request message is provided that describes the current session and identifies the connection user that requires the connection of this particular communications or other service-related network. The MA.sub.c 184 is responsible for ensuring that charging and fulfillment agents are specified in order to provide the particular service instance and use the necessary connections associated with the connection layer 130. Similarly, for a second connection that is required for the particular service instance in the connection layer 130, message path 9.1' is utilized, namely: connection.sub.-- req (session.sub.-- id, connection.sub.-- user, connection.sub.-- req). This message indicates that the FA.sub.si 132 has initiated a second connection request for delivering this particular service. This request is sent to another management agent MA.sub.c 192 of the connection layer 130.

Detailed Description Text (58):
With respect to the first network connection.sub.-- instance, the MA.sub.ci 136 manages the fulfilling and charging for this particular network connection along a path denoted as: 10) charging.sub.-- transaction.sub.-- req (session.sub.-- id, connection.sub.-- user, connection.sub.-- instance.sub.-- request). In accordance with this message, the MA.sub.ci 136 is involved with determining the appropriate charging agent of the connection instance layer 140 associated with this particular network connection, namely, charging agent (CA.sub.ci) 148. The MA.sub.ci 136 determines the appropriate CA.sub.ci 148 since the CA.sub.ci 148 may need fulfillment agent specific information to rate the resources used by the selected fulfillment agent, which takes responsibility for accomplishing this network connection.sub.-- instance function. Similarly, path 10' has the message identified as: charging.sub.-- transaction.sub.-- req (session.sub.-- id, network.sub.-- user, connection instance.sub.-- request). As with path 10, path 10' indicates that the MA.sub.ci 144 has taken responsibility for the second network connection.sub.-- instance by selecting an appropriate charging agent (CA.sub.ci) 152 that takes responsibility for charging for the second network connection.sub.-- instance.

Detailed Description Text (59):
With regard to the first network connection.sub.-- instance, the CA.sub.ci 148 sends an acknowledgement to the MA.sub.ci 136. This acknowledgement message is provided in accordance with path 11 and is identified as: 11) charging.sub.-- transaction.sub.-- ack (session.sub.-- id, connection.sub.-- instance.sub.-- request). In this message, the connection.sub.-- instance.sub.-- request informational element includes connection.sub.-- instance.sub.-- request.sub.-- accounting.sub.-- rules that specify how often an accounting for the fulfillment of this particular network connection.sub.-- instance must be made, e.g., upon completion, periodically (time or service unit based) and resource units required for rating by the CA.sub.ci 148. Likewise, for the second network connection.sub.-- instance along path 11', a message is identified as: 11') charging.sub.-- transaction.sub.-- ack (session.sub.-- id, connection.sub.-- instance.sub.-- request). The same type of acknowledgement is provided to the MA.sub.ci 144 by the CA.sub.ci 152 as it relates to the second network connection.sub.-- instance.

Detailed Description Text (61):
Referring to FIG. 3E, a description is set forth related to completion of the service instance. With respect to the first network connection.sub.-- instance, along path 12.6, a message is defined as: 12.6) release.sub.-- connection (session.sub.-- id). In accordance with this message, the FA.sub.si 132 has assumed responsibility related to the determination that the service instance has been completed. The FA.sub.si 132 also subsequently takes responsibility for

accomplishing the fu●tion(s) necessary to release th●particular network connection by sending a message to the MA.sub.c 184. Similarly, for the second network connection, along path 12.6', a message is defined as: 12.6') release.sub.-- connection (session.sub.-- id). That is, a message describing the current connection (session.sub.-- id) is generated for which FA.sub.si 132 has taken responsibility and which message is received by the second management agent (MA.sub.c) 192. Next, each of the MA.sub.c 184 and MA.sub.c 192 has a message path to the FA.sub.c 188 and the FA.sub.c 196, respectively. These are denoted as: 12.7) release.sub.-- connection (session.sub.-- id) and 12.7') release.sub.-- connection (session.sub.-- id). In accordance with these messages, each MA.sub.c 184 and MA.sub.c 192 takes responsibility for passing these two network connection releases onto their associated fulfillment agents, namely, FA.sub.c 188 and FA.sub.c 196, respectively. Upon receipt of the message related to the release of the first connection, the FA.sub.c 188 takes responsibility for releasing this first network connection. As part of this release, the FA.sub.c 188 initiates a message from the connection layer 130 to the connection instance layer 140 for use in releasing the particular connection.sub.-- instance or dynamic connection that was required to provide the service instance. This message is conveyed along path 12.75 to the MA.sub.ci 136 and is defined as: 12.75) release.sub.-- connection.sub.-- instance (session.sub.-- id). This message includes the informational element that describes the current session being handled for which a release of the particular or dynamic connection is to occur. Similarly, for the second network connection.sub.-- instance to be released, a message is initiated by the FA.sub.c 196 in the connection layer 130 to the MA.sub.ci 144 in the connection instance layer 140 along message path 12.75'. This message is defined as: 12.75') release.sub.-- connection.sub.-- instance (session.sub.-- id). Next, each of the MA.sub.ci 136 and MA.sub.ci 144 has a message path to the FA.sub.ci 156 and FA.sub.ci 160, respectively. These are denoted as 12.76) release.sub.-- connection.sub.-- instance (session.sub.-- id) and 12.76') release.sub.-- connection.sub.-- instance (session.sub.-- id). In accordance with these messages, each MA.sub.ci 136 and MA.sub.ci 144 takes responsibility for passing these two network connection instance releases on to their associated fulfillment agents, namely, FA.sub.ci 156 and FA.sub.ci 160, respectively. Upon receipt of the message related to the first connection.sub.-- instance, the FA.sub.ci 156 takes responsibility for releasing this first network connection.sub.-- instance and reports resource usage using a message defined as: 13) connection.sub.-- instance.sub.-- release (session.sub.-- id, connection.sub.-- instance.sub.-- resources). A similar message is conveyed using FA.sub.ci 160 to MA.sub.ci 144 related to the second network connection.sub.-- instance, namely: 13') connection.sub.-- instance.sub.-- release (session.sub.-- id, connection.sub.-- instance.sub.-- resources). This message also reports resource usage for the second network connection.sub.-- instance to the MA.sub.ci 144, while taking responsibility for release of the second network connection.sub.-- instance. With respect to billing for these two network connection.sub.-- instances, the following paths and associated messages are identified: 14) charge.sub.-- transaction (session.sub.-- id, connection.sub.-- instance.sub.-- resources) and 14') charge.sub.-- transaction (session.sub.-- id, connection.sub.-- instance.sub.-- resources). Message 14 is sent by the MA.sub.ci 136 to the charging agent CA.sub.ci 148, which agent takes responsibility for charging a determined amount for this particular network connection.sub.-- instance based on connection instance resources that are utilized. In accordance with message path 14', similar functions are performed for the second network connection.sub.-- instance that requires a message be sent to CA.sub.ci 152 using MA.sub.ci 144.

Detailed Description Text (64):
With regard to handling how charges are reported to an end user, in accordance with the foregoing example, there are two network connection related charges, two network connection.sub.-- instance related charges and one service related charge. The present invention is adaptable or flexible in being able to provide multiple separate entries to the end user in conjunction with charging the end user or, alternatively, one consolidated entry or a further function could be applied to the multiple charges to generate a new composite charge.

Detailed Description Text (66):
With continued reference to FIG. 3F, the MA.sub.c 184 also takes responsibility for initiating a message from the connection layer 130 to the service instance layer 120 in light of the completion of the particular service instance. More specifically, the MA.sub.c 184 sends a message along path 17 to the fulfillment agent 132 (FA.sub.si). This message is defined as: 17) connection.sub.-- released

(session.sub.-- id). Similarly, the MA.sub.c 192 initiates a message along path 17'
to the FA.sub.si 132, which is defined as: 17') connection.sub.-- released
(session.sub.-- id). The FA.sub.si 132 takes responsibility for handling the
information related to the release of each of the two network connections for the
current session that is identified in the respective messages. Additionally, the
FA.sub.si 132 takes responsibility for reporting service instance resource usage for
the current session to the MA.sub.si 116 in accordance with the message: 18)
service.sub.-- released (session.sub.-- id, service.sub.-- instance.sub.--
resources). Next, a message along path 19 is provided: 19) charge.sub.-- transaction
(session.sub.-- id, service.sub.-- instance.sub.-- resources). This message is sent
to the CA.sub.si 124, which takes responsibility for charging appropriate accounts
based on resource unit usage in the service instance layer 120 and based on
predetermined rules or algorithms. The CA.sub.si 124 is also responsible for using
agent systems to accomplish these functions including the determination of the
amounts to be booked. In that regard, along path 20, a message is sent defined as:
20) debit (session.sub.-- id, service.sub.-- instance.sub.-- request.sub.--
user.sub.-- booking, amount), the BA.sub.si 128 takes responsibility for debiting
the amount to the appropriate account based on the content of the informational
elements in the message. Similarly, along path 21, the proper account is credited
for the particular service instance in accordance with the following: 21) credit
(session.sub.-- id, service.sub.-- instance.sub.-- request.sub.-- user.sub.--
booking, amount). The data and/or information associated with this message is used
by the BA.sub.si 186 in crediting the appropriate provider account for the service
instance that was just delivered.

Detailed Description Text (68):
In continuing with the explanation of the present invention, the foregoing general
example is applied to a specific service instance application. Specifically, a video
on demand service is presented as an example in which the user requests a movie. In
this example, the provider of the service instance and the provider of the network
connection.sub.-- instances are separate business entities. The user has chosen to
pay for each and any service, service instance, connection and connection.sub.--
instance charges by credit card.

Detailed Description Text (69):
As seen in FIG. 4A in this example of an application of the present invention, a set
top box 200 is provided that operatively communicates with a television 204. The set
top box 200 is a network system that is able to initiate the sending of messages to
agents 54 of the agent interface 58. In accordance with the current example, the
particular message relates to a video on demand service. As illustrated in FIG. 4A,
a message path is denoted as originating from the set top box 200 of a user of the
network 10. This path is identified as follows: 1) service.sub.-- req
(session.sub.-- id, user, provider, service.sub.-- request). In accordance with this
message, a request is made from a user (set top box 200) for a service.sub.--
request (video on demand). The identification of a particular provider is optional
since a subsequent determination can be made as to the identity of the provider and,
therefore, a particular provider need not be identified in the message. The message
is conveyed to a management agent (MA.sub.s) 208 in the service layer. The MA.sub.s
208 takes responsibility for a message being generated, based on the service request
that it receives, to a charging agent 220. In this embodiment, the charging agent
220 takes responsibility for handling financial transactions from a number of
different layers, including the service, service instance and connection layers.
Although the charging agent 220 could be considered as being associated with each
one or all of the layers, for this example, it will be designated as being in the
service instance layer and is identified as CA.sub.si 220. The message from the
MA.sub.s 208 to the CA.sub.si 220 is along path 1.1, which is defined as:
charging.sub.-- transaction.sub.-- req (session.sub.-- id, user, service.sub.--
request). This message indicates that a financial transaction for the connection to
be established over the network is being requested. The CA.sub.si 220, in accordance
with this message, is responsible for determining the parameters associated with the
service instance. The CA.sub.si 220 initiates a message along path 1.2 back to the
MA.sub.s 208, which is defined as follows: 1.2) charging.sub.-- transaction.sub.--
ack (session.sub.-- id, service.sub.-- request). This message indicates how often an
accounting for the fulfillment of this video on demand service must be made, e.g.,
upon completion of the video on demand, periodically (time or service unit based)
and resource units that are required for rating by the CA.sub.si 220. In that
regard, the service.sub.-- request includes the informational element service.sub.--
request.sub.-- accounting.sub.-- rules. In addition, the service.sub.-- request
informational element includes a service.sub.-- request.sub.-- service.sub.-- ca

that specifies the particular charging agent to be used for the service instance, namely CA.sub.si 220.

Detailed Description Text (70):
The MA.sub.s 208 also manages the relationship between the service user associated with the set top box 200, and a service provider, who supplies the video on demand service. The MA.sub.s 208 takes responsibility for accomplishing certain functions related to the video on demand service and, in that regard, selects the appropriate fulfillment agent(s) and charging agent(s) to be used for delivery of the particular service instance (particular movie from the video on demand service). The MA.sub.s 208 typically selects a particular charging agent and fulfillment agent based on a service profile generated as a function of the identity of the user requesting the service, the identity of the service request and, optionally, the identity of the provider of the service.

Detailed Description Text (71):
In accomplishing these functions, the MA.sub.s 208 is involved with sending a message along path 2 to a fulfillment agent (FA.sub.s) 212 in the service layer, which is defined as: 2) service.sub.-- req (session.sub.-- id, service.sub.-- user, service.sub.-- request). In accordance with this message, the service user of the service layer is identified as making a service request with the current session.sub.-- id describing the particular service being requested as it relates to fulfilling a video on demand service. The FA.sub.s 212 takes responsibility for fulfilling the particular service instance and in selecting the appropriate management agent for delivery of the desired service instance (providing the movie selected by the user). In doing this, the FA.sub.s 212 takes responsibility for a message being sent along path 3 to a management agent (MA.sub.si) 216 in the service instance layer. This message is denoted as: 3) service.sub.-- instance.sub.-- req (session.sub.-- id, service.sub.-- user, service.sub.-- instance.sub.-- request). In accordance with this message, the MA.sub.si 216 manages the financial transaction and fulfillment of the service instance associated with providing the particular movie using the video on demand service. With regard to managing the financial transaction, the MA.sub.si 216 takes responsibility for sending a message along path 4 to a charging agent (CA.sub.si) 220 in the service instance layer, in accordance with the following: 4) charging.sub.-- transaction.sub.-- req (session.sub.-- id, service.sub.-- user, service.sub.-- instance.sub.-- request). The particular charging agent 220 is specified by the content of the informational element service.sub.-- instance.sub.-- ca, which is part of the service.sub.-- instance.sub.-- request. Also part of the service.sub.-- instance.sub.-- request informational element is a service.sub.-- instance.sub.-- user.sub.-- booking, which identifies both the booking agent to be used and also provides booking information, e.g., is a credit check required before delivery of this service instance. Next, the CA.sub.si 220 takes responsibility for a message that is received by a booking agent (BA.sub.si) 224 of the service instance layer along path 5 and which message is defined as: 5) check.sub.-- credit (session.sub.-- id, service.sub.-- user, service.sub.-- instance.sub.-- amount). The BA.sub.si 224 checks this service user's credit for the amount identified in the message. If the credit is satisfactory, the BA.sub.si 224 decrements available credit by this amount. In acknowledging the credit check, the BA.sub.si 224 takes responsibility for sending a message back to the CA.sub.si 220 acknowledging the credit check of the service user in accordance with the message path defined as: 6) check.sub.-- credit.sub.-- ack (session.sub.-- id). This message indicates to the CA.sub.si 220 that, for the current session.sub.-- id directed to the particular movie being requested, the user's credit has been checked and found satisfactory for fulfilling or delivering this particular movie. The CA.sub.si 220 then takes responsibility for sending a message to the MA.sub.si 216, which message relates to accounting for the fulfillment of the service instance (delivery of a movie using a video on demand service). More specifically, along path 7, the following message is defined: 7) charging.sub.-- transaction.sub.-- ack (session.sub.-- id, service.sub.-- instance.sub.-- request). With this message, the MA.sub.si 216 receives information directed to describing the current session and the service instance request includes service.sub.-- instance.sub.-- request.sub.-- accounting.sub.-- rules, which specify how often an accounting for this particular fulfillment must be made, such as upon completion of the movie being sent to the user or periodically, based on time or service units and the resource units for charging or rating that are required by the CA.sub.si 220.

Detailed Description Text (78):
Each of the MA.sub.ci 236 and the MA.sub.ci 240 takes responsibility for initiating a financial transaction associated with the network, as defined by these respective

paths: 10) charging.sub.-- transaction.sub.-- req (session.sub.-- id, connection.sub.-- user, connection.sub.-- instance.sub.-- request) and 10') charging.sub.-- transaction.sub.-- req (session.sub.-- id, connection.sub.-- user, connection.sub.-- instance.sub.-- request). In each case, the MA.sub.ci 236 and MA.sub.ci 240 initiates a financial transaction by initiating the sending of a message to a charging agent (CA.sub.ci) 244 associated with the connection instance layer. In each case, the MA.sub.ci 236 and the MA.sub.ci 240 takes responsibility for determining that the CA.sub.ci 244 should take responsibility for charging for the network connection.sub.-- instances related to the providing of the particular movie. These connection management agents make sure that the charging agent 244 receives the necessary specific information to rate the resources used by one or more fulfillment agents that are involved in fulfilling the one or more network connections.

Detailed Description Text (79):
Referring to FIG. 4B, the CA.sub.ci 244 is involved with a message being sent to each of two management agents in the connection instance layer, which messages are identified as: 11) charging.sub.-- transaction.sub.-- ack (session.sub.-- id, connection.sub.-- instance.sub.-- request) and 11') charging.sub.-- transaction.sub.-- ack (session.sub.-- id, connection.sub.-- instance.sub.-- request). Each of these acknowledging messages contain information or data that specifies how often an accounting for the fulfillment of this network connection.sub.-- instance must be made for the particular movie that is being transmitted, just as was done in the other layers. Such information or data related to the accounting is contained in the connection.sub.-- instance.sub.-- request.sub.-- accounting.sub.-- rules informational element which may include information that the accounting for this connection.sub.-- instance fulfillment is to made upon completion of the particular network connection.sub.-- instance or on a periodic basis, based on time and/or service units. Suchinformation is also expected to include the resource units for rating that are required by the CA.sub.ci 244.

Detailed Description Text (81):
With reference to FIG. 4C, the description of the example is continued with the video on demand service having been completed. Specifically, along paths 12.6 and 12.6', messages that originate in the service instance layer involving the FA.sub.si 224 are received by connection layer management agents MA.sub.c 282 and MA.sub.c 284, respectively, and which are denoted as: 12.6) release.sub.-- connection (session.sub.-- id) and 12.6') release.sub.-- connection (session.sub.-- id). Each of these received messages provides information to the respective management agents 282, 284 that the current session being described is now finished and these two agents must take responsibility for managing the release of the previously formed connections. In doing so, the FA.sub.c 288 and the FA.sub.c 286 receive messages initiated by the MA.sub.c 282 and the MA.sub.c 284 along paths 12.7 and 12.7', namely: 12.7) release.sub.-- connection (session.sub.-- id) and 12.7') release.sub.-- connection (session.sub.-- id). In accordance with these messages, each of the MA.sub.c 282 and the MA.sub.c 284 takes responsibility for managing the appropriate fulfillment agents which, in turn, assume responsibility for releasing the first and second network connections made with the necessary communications or other service-related networks because the delivery of the particular movie to the user has been completed. In that regard, the FA.sub.c 288 initiates a message along path 12.75 to the connection instance layer. That is, a message is received by the MA.sub.ci 236. Similarly, the FA.sub.c 288 initiates a message along path 12.75' to the MA.sub.ci 240 in the connection instance layer related to releasing the specific network connections that were utilized in delivery of the particular movie. These messages along paths 12.75 and 12.75' are defined as: 12.75) release.sub.-- connection.sub.-- instance (session.sub.-- id) and 12.75') release.sub.-- connection.sub.-- instance (session.sub.-- id). Each of these received messages provides information to the respective management agents 236, 240 that the current session being described is now finished and these two agents must take responsibility for managing the release of the previously formed connection.sub.-- instances. In order to do so, the FA.sub.ci 248 and the FA.sub.ci 252 receive messages initiated by the MA.sub.ci 236 and the MA.sub.ci 240 along paths 12.76 and 12.76', namely: 12.76) release.sub.-- connection.sub.-- instance (session.sub.-- id) and 12.76') release.sub.-- connection.sub.-- instance (session.sub.-- id). In accordance with these messages, each of the MA.sub.ci 236 and the MA.sub.ci 240 takes responsibility for managing the appropriate fulfillment agents which, in turn, assume responsibility for releasing the dynamically generated network connection.sub.-- instances, since the delivery of the particular movie to the user has been completed. The FA.sub.ci 248 and the FA.sub.ci 252 also take responsibility

for generating proprietary messages that disconnect the previously provided
communication paths through the network 232 along paths 12.8 and 12.8'. Referring
next to FIG. 4D, messages are initiated by the FA.sub.ci 248 and the FA.sub.ci 252
that are received by the MA.sub.ci 236 and the MA.sub.ci 240 along paths 13 and 13'
which are defined as: 13) connection.sub.-- instance.sub.-- released (session.sub.--
id, connection.sub.-- instance.sub.-- resources) and 13') connection.sub.--
instance.sub.-- released (session.sub.-- id, connection.sub.-- instance.sub.--
resources). In accordance with these messages, information is provided that the
network connection.sub.-- instances are released and resource usage is reported to
these management agents, who will take responsibility for managing the charging
associated with the network connection.sub.-- instances that delivered the selected
movie. In that regard, the CA.sub.ci 244 receives messages along paths 14 and 14'
that are identified as: 14) charge.sub.-- transaction (session.sub.-- id,
connection.sub.-- instance.sub.-- resources) and 14') charge.sub.-- transaction
(session.sub.-- id, connection.sub.-- instance.sub.-- resources). In accordance with
these messages, the charging agent 244 takes responsibility for determining and
charging the amount for these network connection.sub.-- instances associated with
the particular service instance. As part of this responsibility, the CA.sub.ci 244
is responsible for sending messages that are received by one or more booking agents.
In particular, a booking agent (BA.sub.ci) 260 is responsible for functions related
to the debiting of the user's account. In the present example, this involves a
credit card whereby the appropriate account in the credit card company 264 is
debited for these network connection.sub.-- instances. Similarly, the booking agent
(BA.sub.ci) 268 receives a message that results in the BA.sub.ci 268 taking
responsibility for crediting the accounts receivable 272 of the connection.sub.--
instance (network) owner, based on data and/or other information for which the
CA.sub.ci 244 takes responsibility. These messages are identified as follows:

Detailed Description Text (86):
As with the previous description given in connection with the general example of
FIGS. 3A-3E, messages are sent to agents, along the paths identified in FIG. 4D,
related to accomplishing the necessary functions and to generating further messages
and sending them to agents in the connection, service instance and service layers
directed to the release of the network connections, the release of the service
instance and the release of the service, together with information and data that
enables the connection (communication or other service related network connection
that was required to deliver the movie), service instance (delivery of the movie)
and service (video on demand) to be charged and booked using appropriate agents and
agent systems, including an accounts receivable 276 associated with the provider or
server 228 for the service, service instant and "static" connections related to the
delivery of the movie. These messages are defined as:

Detailed Description Text (96):
19) charge.sub.-- transaction (session.sub.-- id, service.sub.-- instance.sub.--
resources);

Detailed Description Text (104):
With reference to FIG. 5, a further illustration is provided that summarizes certain
information that is required by the agents of the four network layers, as applied to
billing functions. In that regard, for each of the four layers, an information model
is presented that identifies information/data required by these different agents.
With respect to the service instance layer, the management agent (MA) receives
information and/or data directed to the service instance relationship including the
identity of the service instance user, the type of service, the provider of the
service instance and a current description of the particular service instance, such
as the movie selected using the video on demand service. The fulfillment agent (FA)
of the service instance layer requires information related to the delivery of the
service including the current session that describes the service instance to be
provided, such as the particular movie to be delivered. The information/data
required by this agent also includes the algorithm or rules necessary to accomplish
the fulfillment. Additional information to the fulfillment agent in the service
instance layer includes the identities of the user and the provider for the
particular application instance. The charging agent (CA) of the service instance
layer receives financial transaction data and information including the current
session describing the service instance and a rating algorithm for use in charging
for the service instance. Booking agents (BA) receive information related to
debiting and crediting appropriate accounts including a description of the current
session.

CLAIMS:

2. A method for facilitating the supplying of services using a network in which there are a number of service providers and in which there are a plurality of mechanized agents to take responsibility for the accomplishment of desired functions, a plurality of mechanized agent systems for accomplishing the functions initiated by the mechanized agents and with a plurality of messages being received by the mechanized agents in connection with providing the services, the method comprising:

initiating a request to a management agent using a control channel for a first service instance to be provided to a first user by a first service provider, said management agent being responsible for managing the relationship between the first user and the first service provider involving the delivery of said first service instance;

invoking a fulfillment agent a first time using said management agent and in which said fulfillment agent receives a first message that includes informational elements related to an identity of said first user and a description of the first service instance, said fulfillment agent being responsible for operations to be performed by one or more agent systems including at least a first function related to delivery of said first service instance to the first user;

invoking a charging agent a first time using said management agent and in which said charging agent takes responsibility for charging for said first service instance and charging in which said charging agent receives a second message that includes informational elements related to the identity of the first user and a description of said first service instance, and in which said charging agent delays complete charging for said first service instance until after said first service instance is terminated;

requesting a first component service instance using said fulfillment agent, and in which said first component service instance is involved with a second function, different from said first function, and with both of said first and second functions being needed to provide said first service instance to the first user;

providing said first service instance to the first user over a first service delivery channel in said network, different from said control channel, after said requesting of said first component service instance and after said invoking of said fulfillment agent and said charging agent said first time;

generating a termination request for terminating said first service instance;

invoking said fulfillment agent a second time after said generating step in connection with the termination of said first service instance and in which said fulfillment agent receives a third message that includes informational elements related to the identity of the first user and a description of said first service instance and in which said fulfillment agent takes responsibility for operations related to termination of said providing of said first service instance;

invoking said charging agent a second time after said step of generating said termination request for terminating said first service instance using one of said management agent and said fulfillment agent and in which said charging agent receives a fourth message that includes informational elements related to data based on the amount of use by the first user of said first service instance and charging parameters for use in determining charges for said first service instance including said providing thereof;

discontinuing use of said first service delivery channel in connection with said first service instance;

initiating a request to said management agent for a second service instance to be provided to a second user by the first service provider;

invoking said fulfillment agent a third time using said management agent and in which said fulfillment agent receives a fifth message that includes informational elements related to the identity of the second user and a description of said second service instance, said fulfillment agent being responsible for operations to be performed by one of more agent systems, including at least a first function, related to delivery of said second service instance to the second user;

invoking said charging agent a third time using said management agent and in which said charging agent receives a sixth message that includes informational elements related to the identity of the second user and a description of said second service instance;

requesting a second component service instance, different from said first component service instance, using said fulfillment agent and in which said second component service instance is involved with providing a second function, different from said first function, and with both of said first and second functions being needed to provide said second service instance to the second user by the first provider;

providing said second service instance to the second user after said requesting of said second component service instance and after said invoking of said fulfillment agent and said charging agent said third time;

generating a termination request for terminating said second service instance;

invoking said fulfillment agent a fourth time after said generating step in connection with termination of said second service instance and in which said fulfillment agent receives a seventh message that includes informational elements related to the identity of the second user and a description of the second service instance and in which said fulfillment agent takes responsibility for operations related to termination of said providing of said second service instance;

invoking said charging agent a fourth time after said step of generating said termination request for terminating said second service instance using one of said management agent and said fulfillment agent and in which said charging agent receives a eighth message that includes informational elements related to the identity of the second user, data based on the amount of use by the second user of said second service instance and charging parameters for use in determining charges for delivery of said second service instance and in which said charging agent is responsible for determining charges for said second service instance including said providing thereof;

wherein, for each of said first and second service instances, charging for said first and second service instances is pre-established so that the first and second users are not involved in negotiating charging terms with the first service provider in order to conduct said providing of said first and second service instances;

wherein said charging agent, together with its operational relationship involving said management agent and said fulfillment agent, are known and pre-established for charging for said first and second service instances before said first and second services instances are initiated by the first and second users, respectively;

wherein each of said management agent, said fulfillment agent and said charging agent is a mechanized agent and each communicates with a different one of said plurality of mechanized agent systems, said plurality including a first agent system communicating with said charging agent and in which said first agent system is modular wherein, when said first agent system is replaced by a second agent system, said first charging agent communicates the same informational elements to said second agent system as said first charging agent communicated with said first agent system;

wherein each of said management agent, said fulfillment agent and said charging agent is responsible for a predetermined function that is different from each predetermined function of each of the other of said management agent, said fulfillment agent and said charging agent; and

wherein each of said informational elements of each of said one through eighth messages is provided in a predetermined order and format acceptable to said agents and in which each of said management, fulfillment and charging agents initiates a predetermined response depending on content of said messages.

6. A method, as claimed in claim 2, wherein:

said charging agent is used in providing a ninth message that is sent to a booking agent for taking responsibility in connection with crediting or debiting an account related to said first service instance.

14. A method, as claimed in claim 2, wherein:

said management agent takes responsibility for accomplishing functions related to:
managing fulfillment of said first service instance, managing charging for said
first service instance and managing booking of charges for said first service
instance.

19. A method, as claimed in claim 2, wherein:

said step of initiating a request for said first service instance includes invoking
a further agent, different from said management, fulfillment and charging agents and
in which said further agent is used in initiating said request to said management
agent.

20. An architecture for facilitating the providing of services using a network,
comprising:

a network for providing available services to users, said network including support
systems for supporting the providing of the services, said support systems having a
plurality of agent systems and said network having a plurality of network systems
including hardware and software required for proper network operation, said network
further including a control channel for carrying a request related to a service
instance to be provided to a user and a service providing channel, different from
said control channel, through which a service instance is to be delivered; and

an operations gateway in operative communication with said network including said
network systems and said agent systems, said operations gateway including a
plurality of agents, said agents constituting an interface that takes responsibility
for the accomplishment of one or more functions using said agent systems, said
agents receiving messages from said agent systems, said network systems and others
of said plurality of said agents, each of said messages including informational
elements useful in providing the services;

wherein said plurality of agents includes a management agent, a fulfillment agent
and a charging agent, said management agent being responsible for managing the
relationship between service users and service providers including a first user, a
second user and a first service provider, the fulfillment agent being responsible
for operations to be performed by one or more agent systems including at least a
first function related to delivery of said first service instance to the first user
and a first function related to delivery of said second service instance, said
charging agent taking responsibility for said first service instance and said second
service instance and in which said charging agent delays complete charging for each
of said first and second service instances until after each of said first and second
service instances, respectively, is terminated;

first means for providing a first component service instance in which said first
component service instance involves using said fulfillment agent and said first
component service instance has a second function in connection with said first
service instance, which is different from said first function, and with both of said
first and second functions being needed to provide said first service instance to
the first user;

second means for providing a second component service instance in which said second
component service instance involves using said fulfillment agent and said second
component service instance has a second function in connection with said second
service instance, which is different from said first function, and with both of said
first and second functions being needed to provide said second service instance to
the second user;

wherein said plurality of messages include:

a first message received by said fulfillment agent that includes informational
elements related to an identity of the first user and a description of said first
service instance and in which said first message is received using said management
agent before completion of said first service instance;

a second message received by said charging agent that includes informational
elements related to the identity of the first user and a description of said first

service instance and in which said second message is received before completion of said first service instance;

a third message received by said fulfillment agent that includes informational elements related to the identity of the first user and a description of said first service instance and in which said third message is received in connection with termination of said first service instance;

a fourth message received by said charging agent that includes informational elements related to data based on the amount of use by the first user of said first service instance and charging parameters for use in determining charges for said first service instance including providing thereof and in which said fourth message is received in connection with termination of said first service instance;

a fifth message received by said fulfillment agent that includes informational elements related to an identity of the second user and a description of said second service instance and in which said fifth message is received using said management agent before completion of said second service instance;

a sixth message received by said charging agent that includes informational elements related to the identity of the second user and a description of said second service instance and in which said sixth message is received before completion of said second service instance;

a seventh message received by said fulfillment agent that includes informational elements related to the identity of the second user and a description of said second service instance and in which said seventh message is received in connection with termination of said second service instance; and

an eighth message received by said charging agent that includes informational elements related to data base based on use by the second user of said second service instance and charging parameters for use in determining charges for said second service instance and in which said seventh message is received in connection with termination of said second service instance;

wherein said charging agent, together with its operational relationship with said management agent and said fulfillment agent, are known and pre-established for charging for said first and second service instances before said first and second service instances are initiated by the first and second users, respectively;

wherein each of said management agent, said fulfillment agent and said charging agent is a mechanized agent and each communicates with a different one of said plurality of mechanized agent systems, said plurality including a first agent system communicating with said charging agent and in which said first agent system is modular wherein, when said first agent system is replaced by a second agent system, said charging agent communicates the same informational elements to said second agent system as said charging agent communicated with said first agent system;

wherein each of said management agent, said fulfillment agent and said charging agent is responsible for a predetermined function that is different from each predetermined function of each of the other of said management agent, said fulfillment agent and said charging agent; and

wherein each of said informational elements of each of said one through eighth messages is provided in a predetermined order and format acceptable to said agent that receives said messages and in which each of said management, fulfillment and charging agents initiates a predetermined response depending upon content of said messages.

28. An architecture, as claimed in claim 20, wherein:

said plurality of agents includes a booking agent that receives a message from said charging agent, with said booking agent taking responsibility for debiting or crediting an account of the first user in connection with said first service instance.